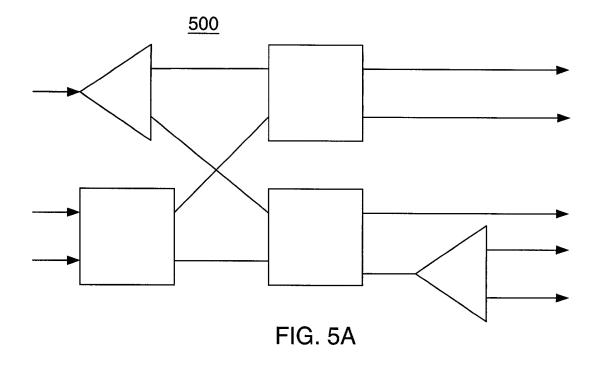
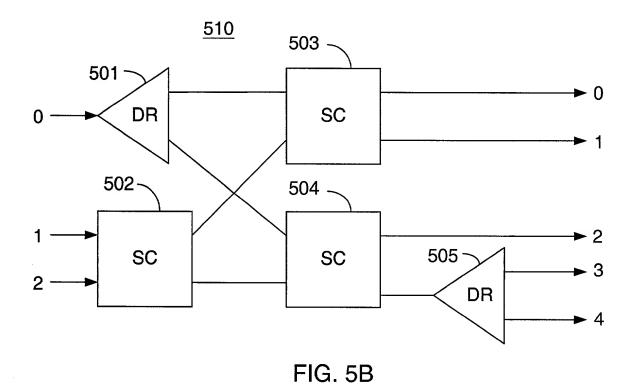


FIG. 4





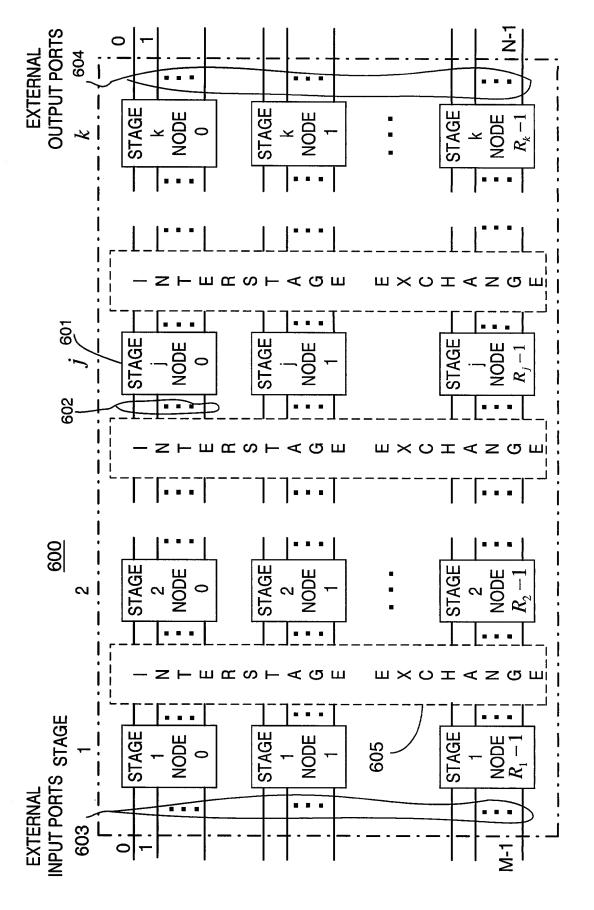
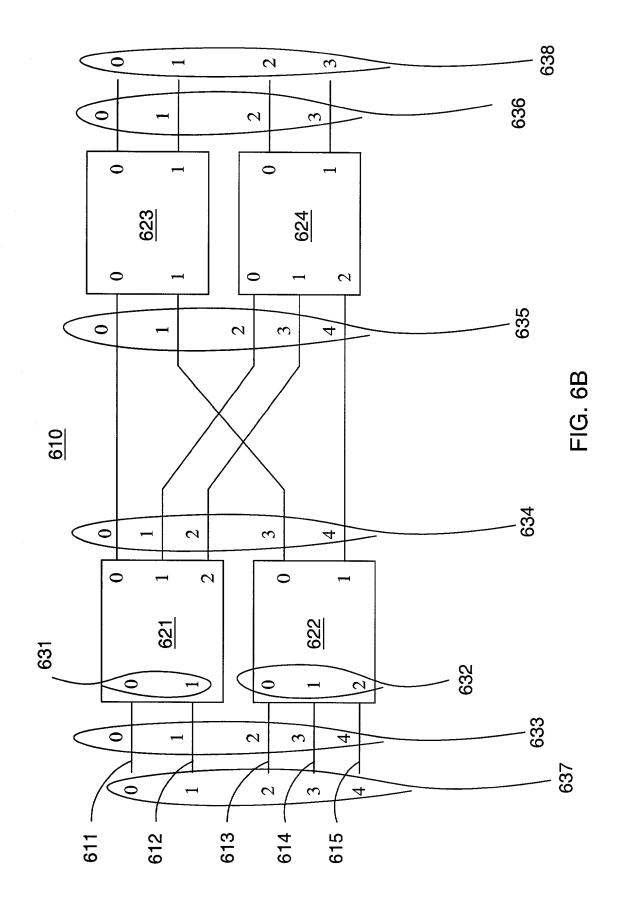
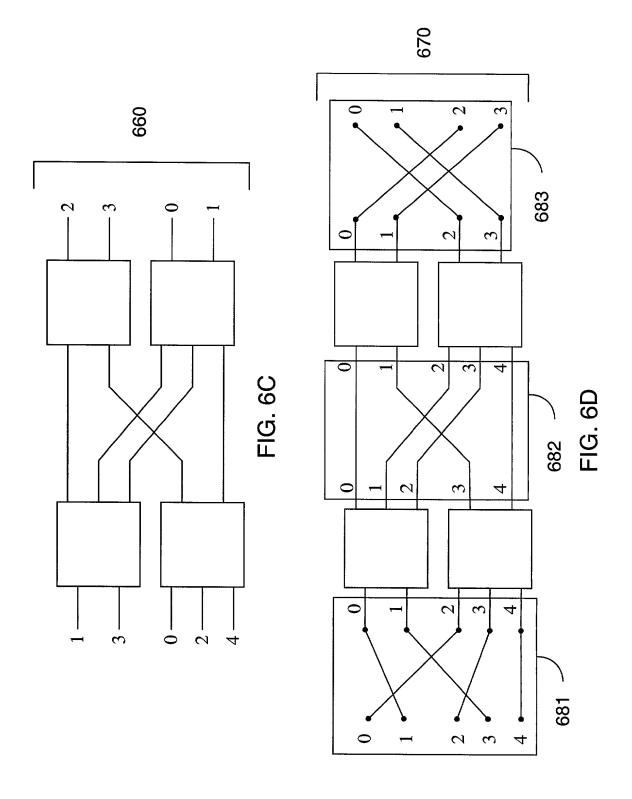
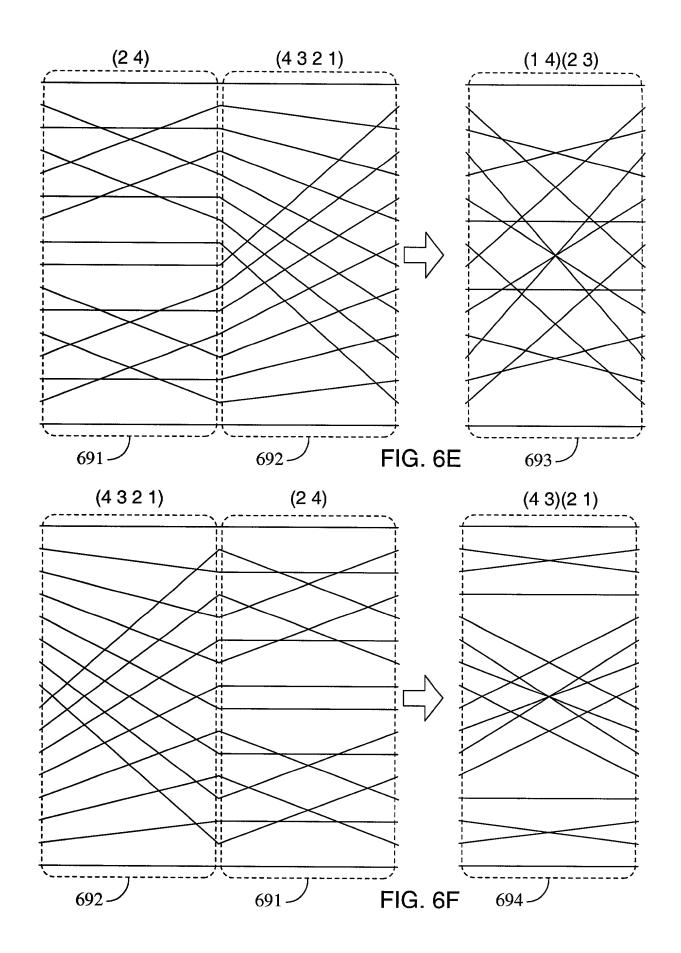
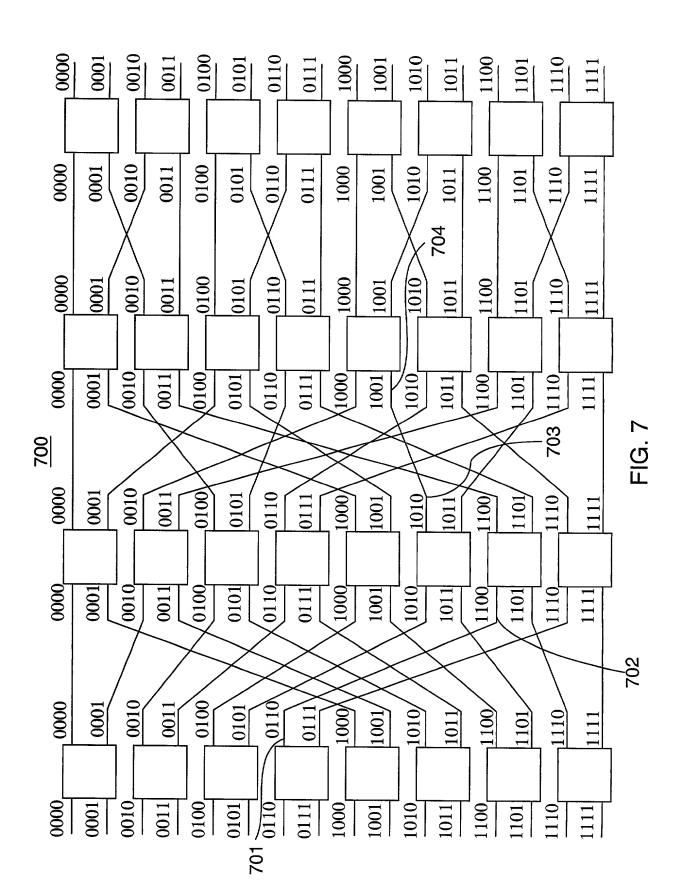


FIG. 6A

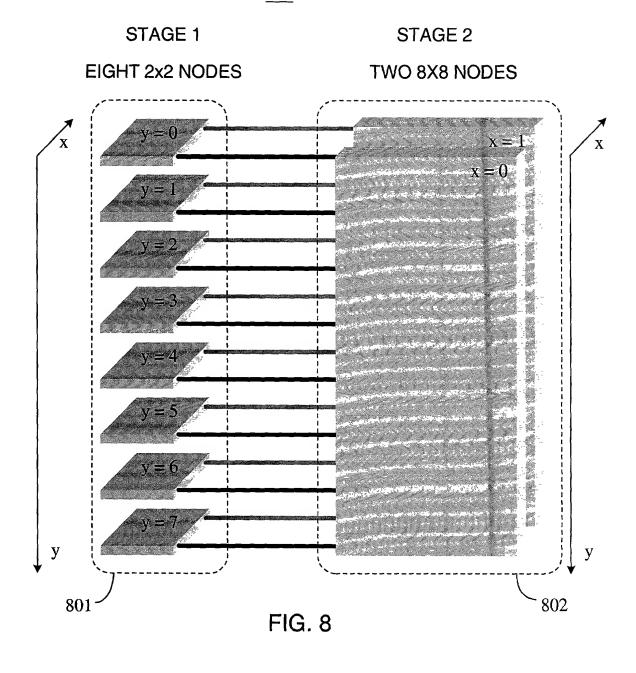


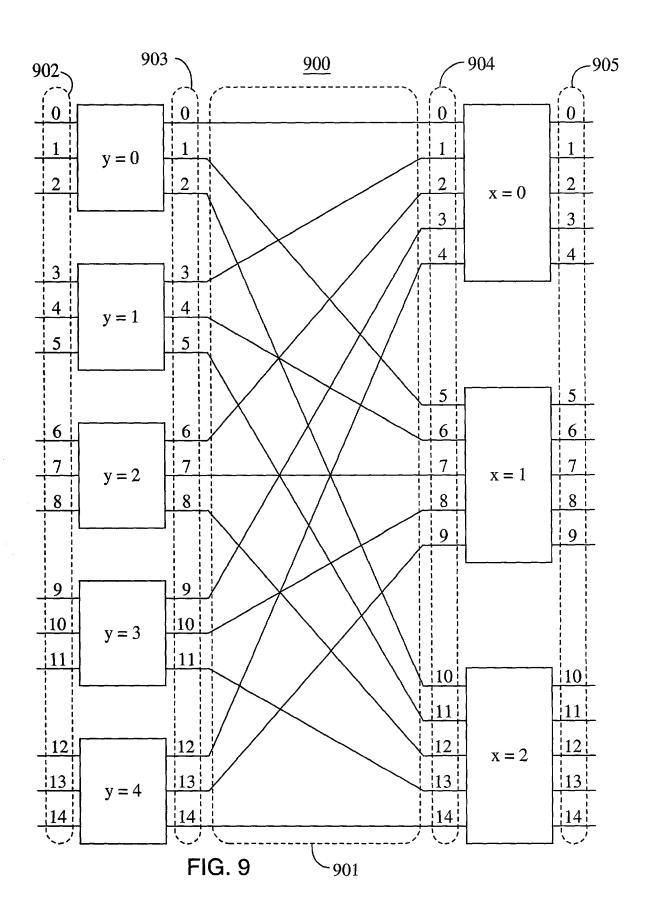


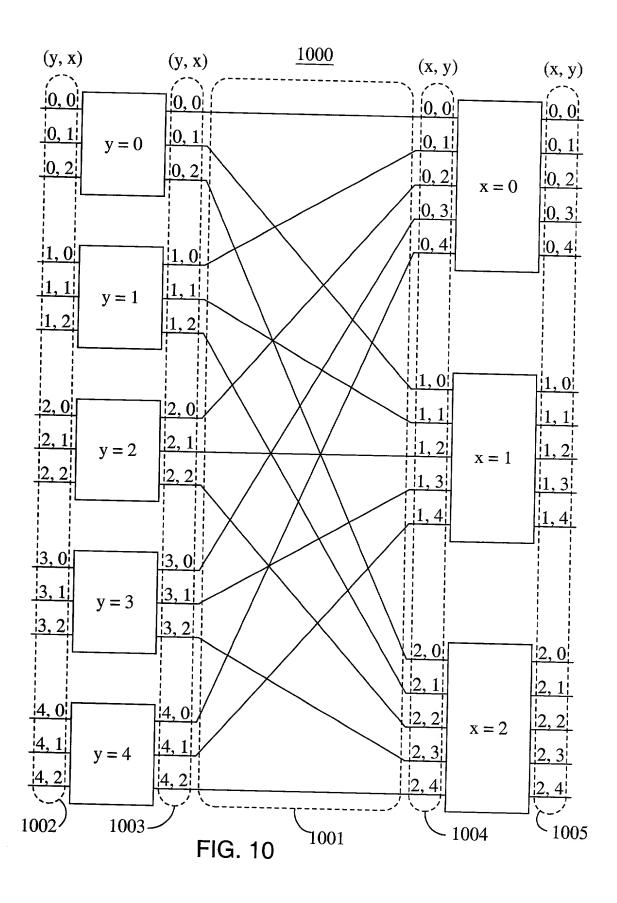


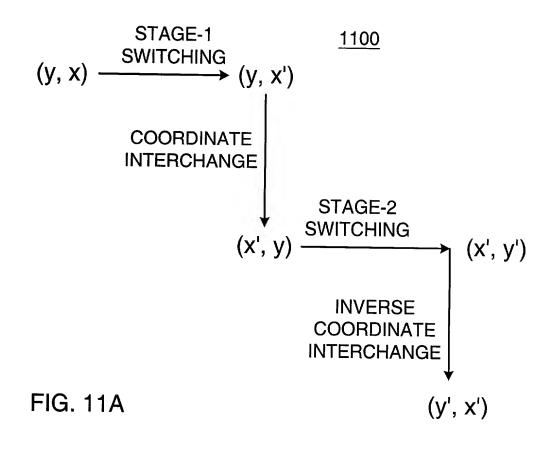


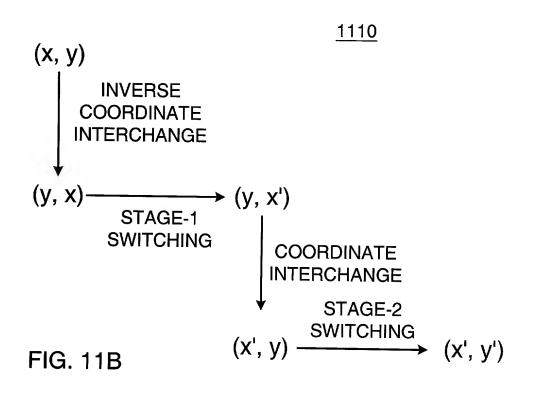
800

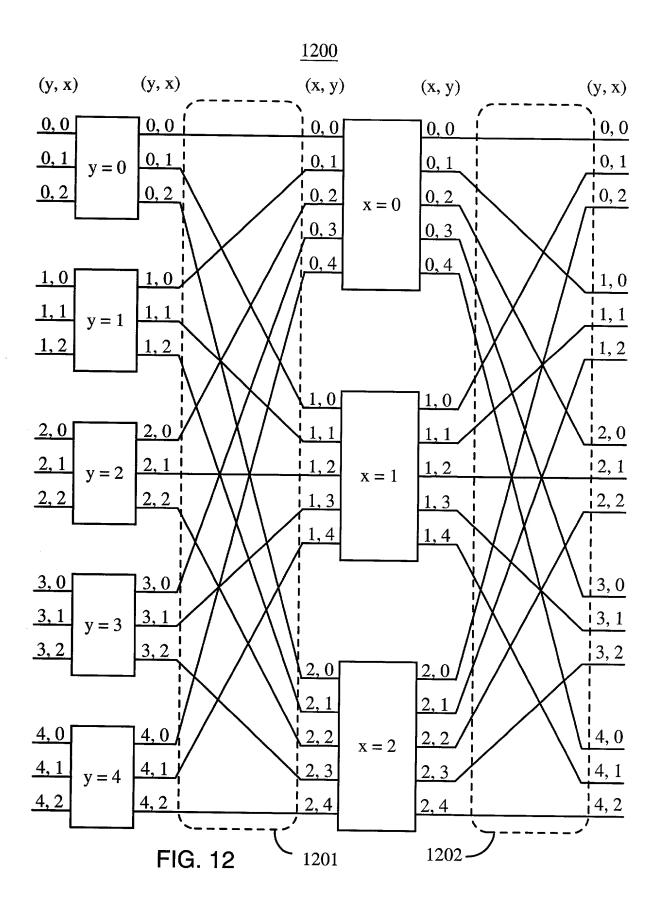


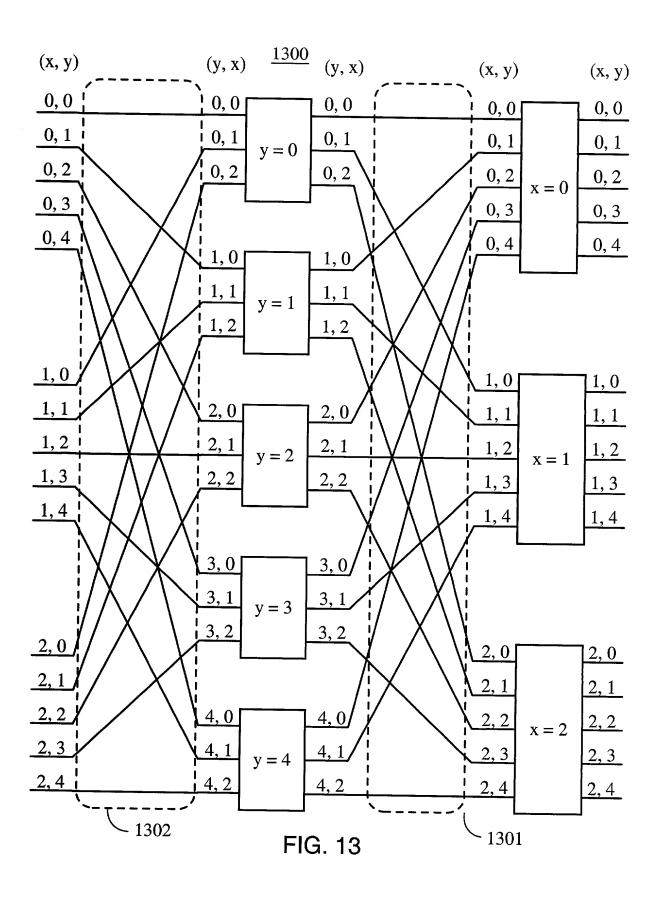


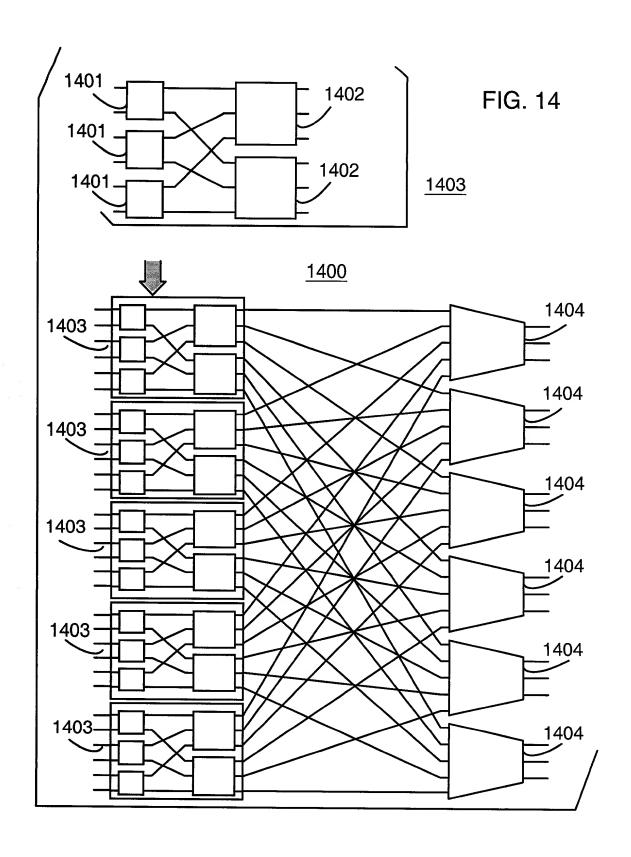












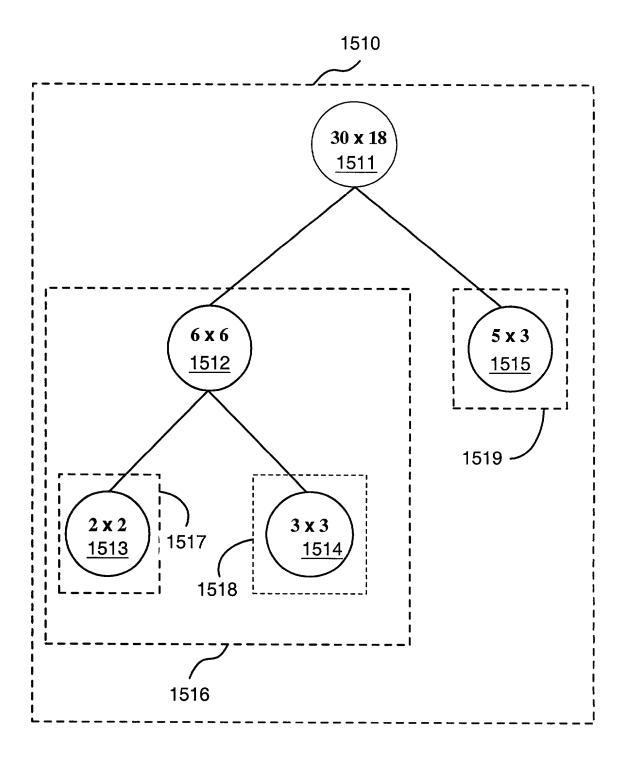
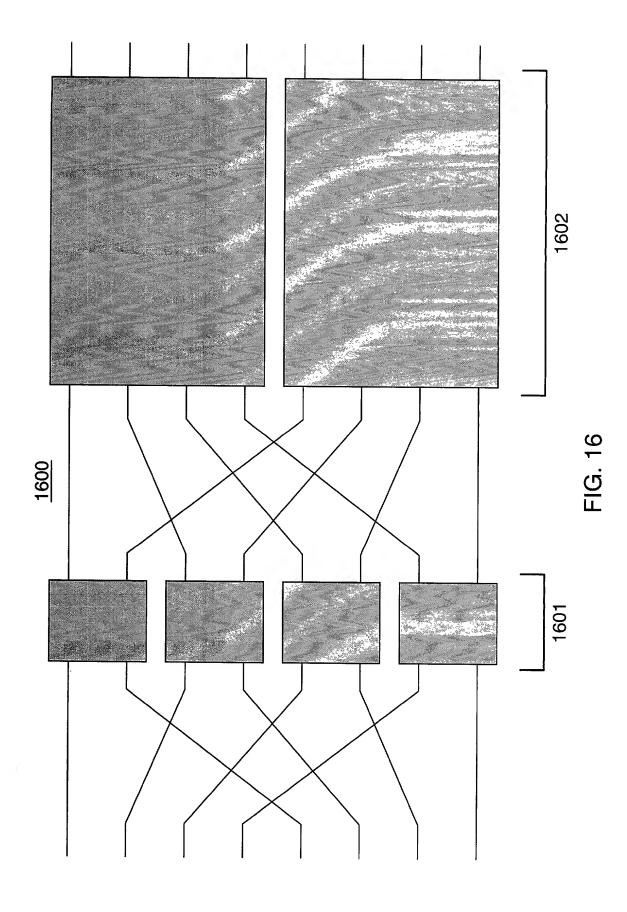
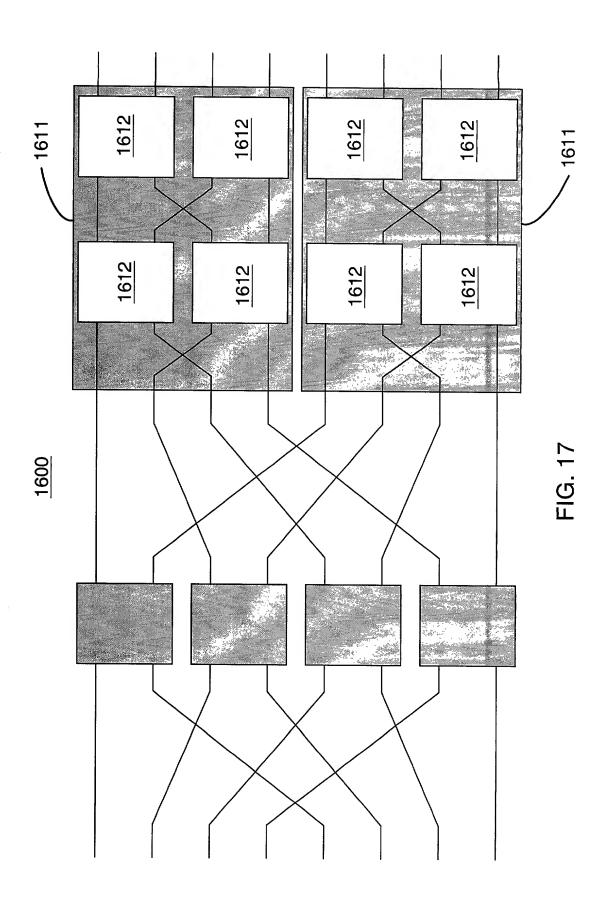
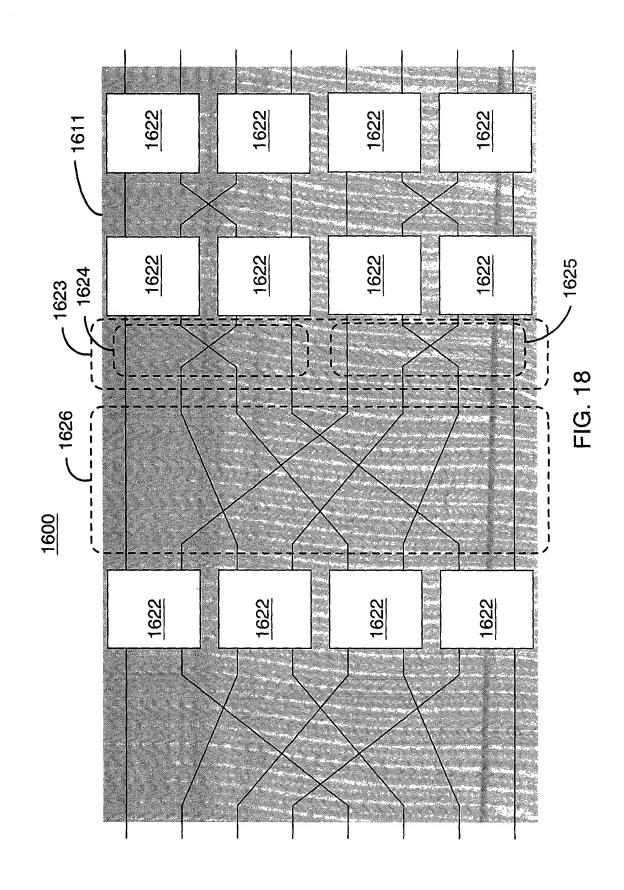


FIG. 15







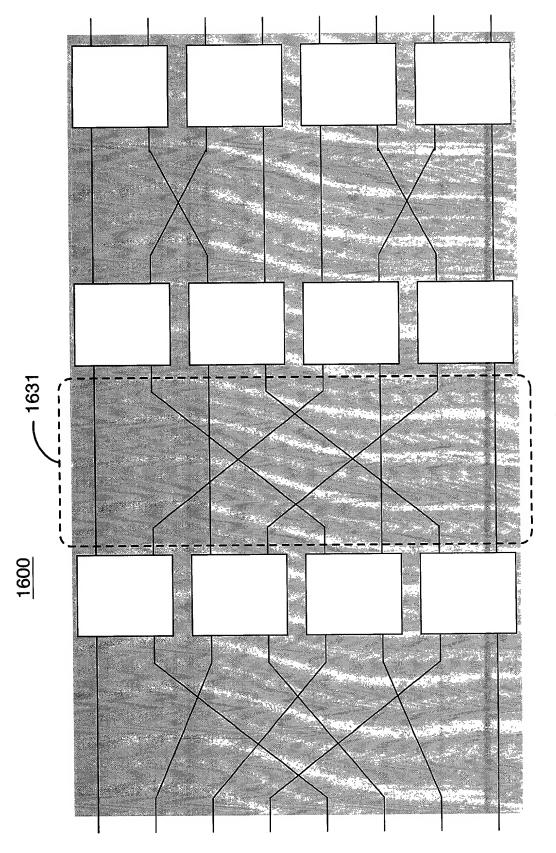


FIG. 19

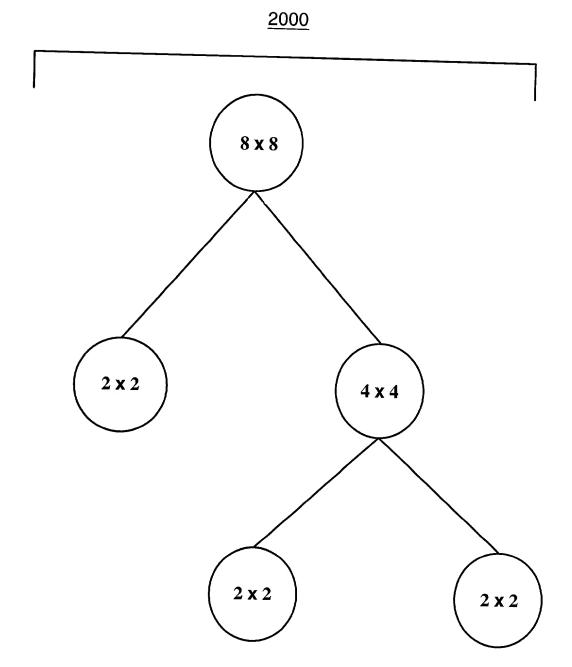
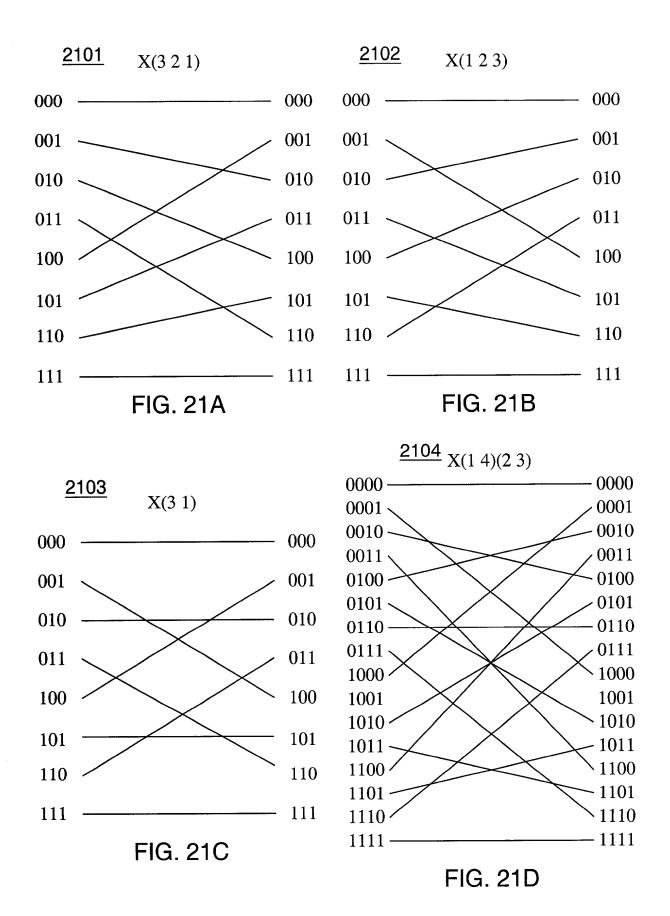
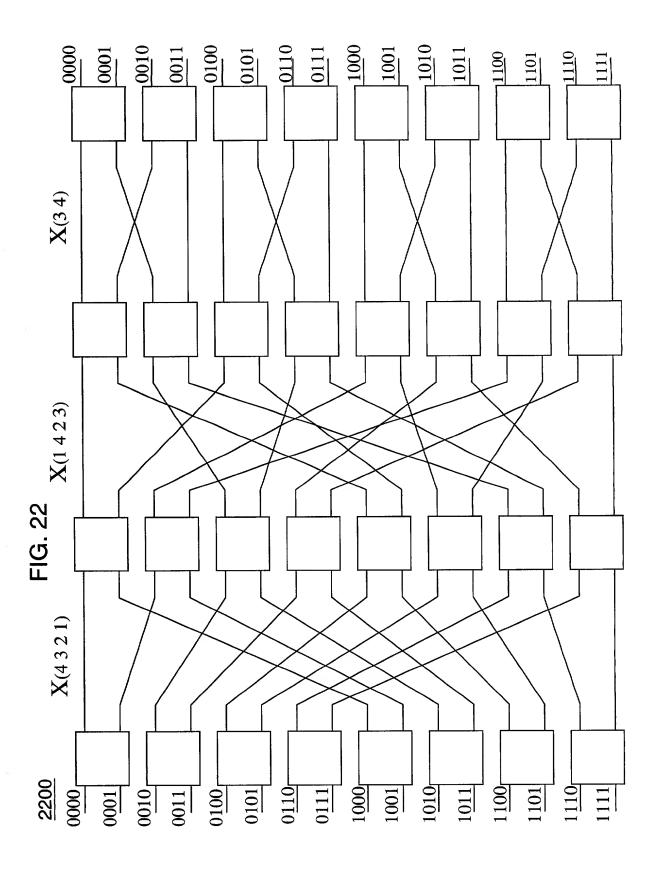
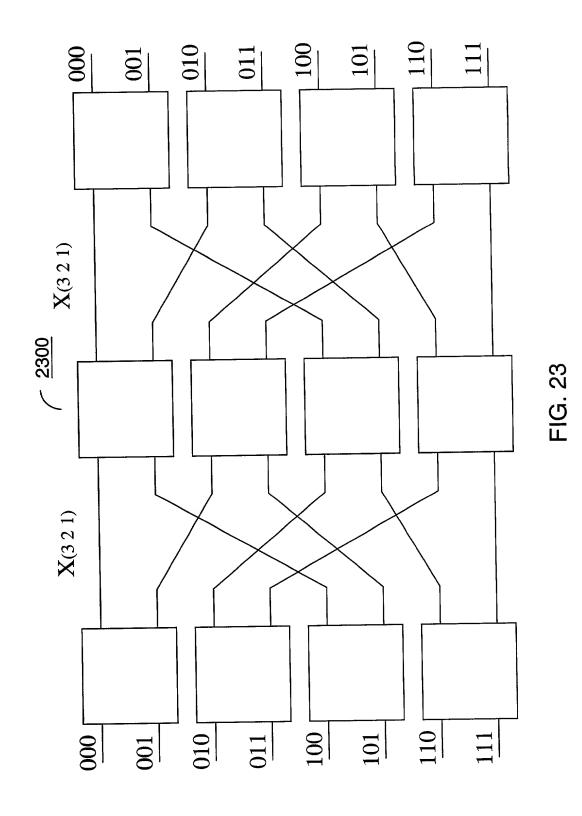


FIG. 20







<u>2400</u>

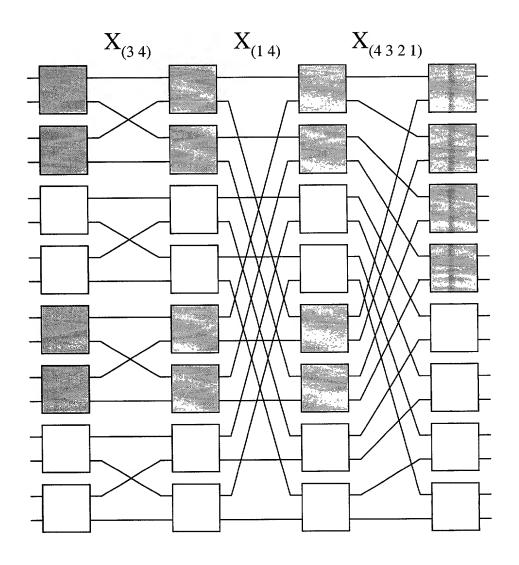
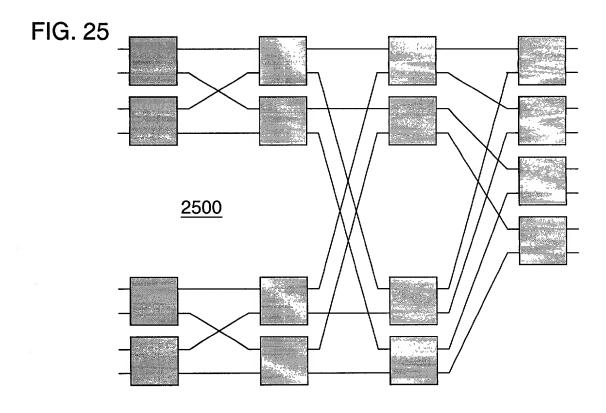
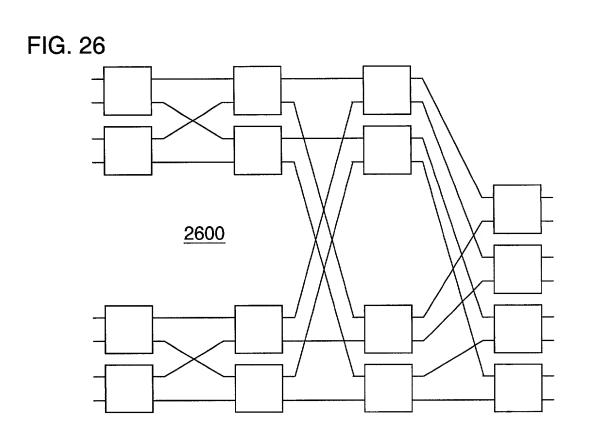
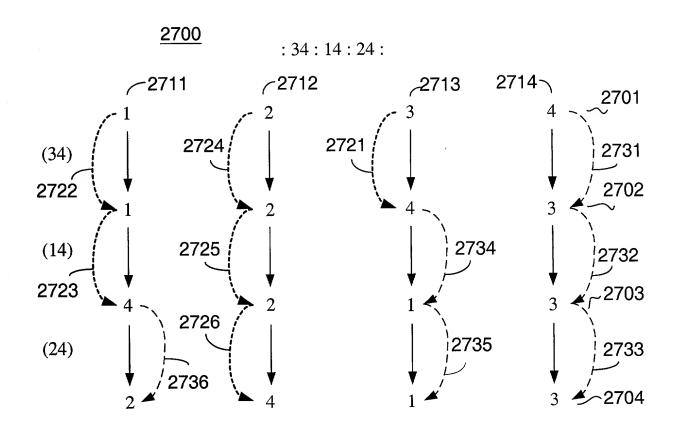


FIG. 24







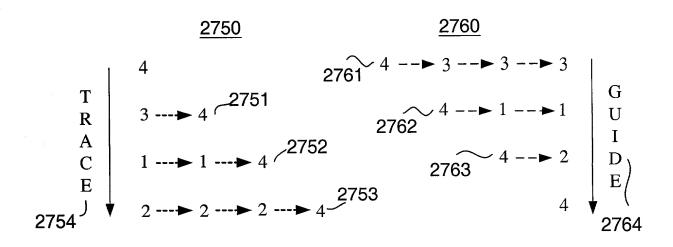


FIG. 27

Trace
$$\begin{pmatrix} 4321 \end{pmatrix} : (14) : (24) : (34) : \\ 1 \longrightarrow 4 \\ 2 \longrightarrow 1 \longrightarrow 4 \\ 2 \longrightarrow 2 \longrightarrow 4 \\ 4 \longrightarrow 3 \longrightarrow 3 \longrightarrow 3 \longrightarrow 4$$

FIG. 28A

FIG. 28B

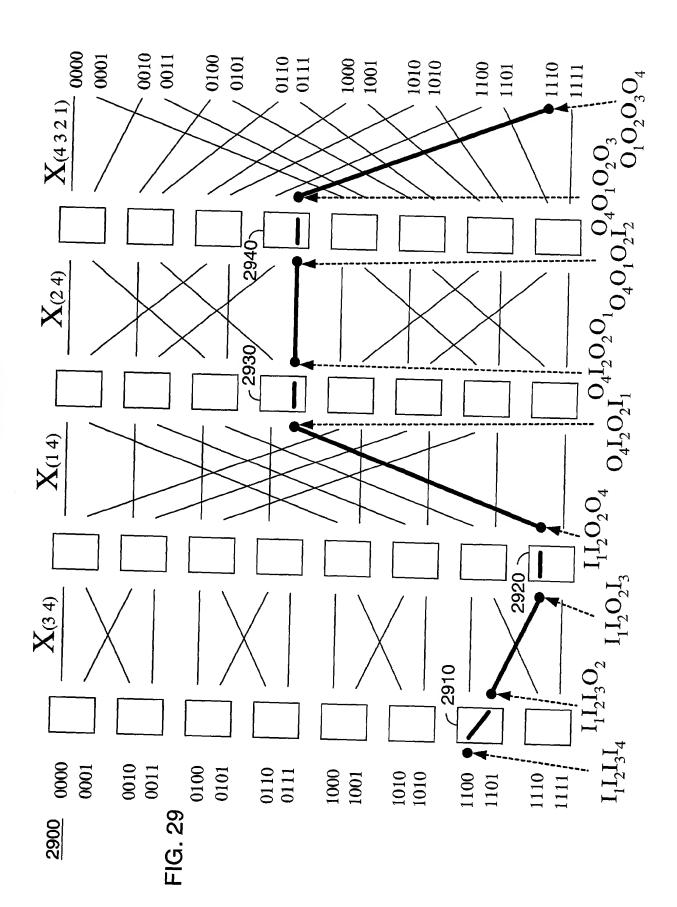
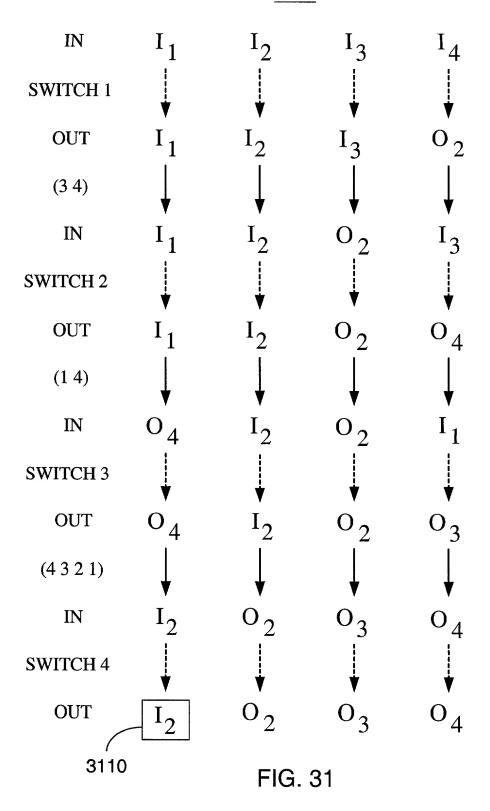


FIG. 30A

FIG. 30B

<u>3100</u>



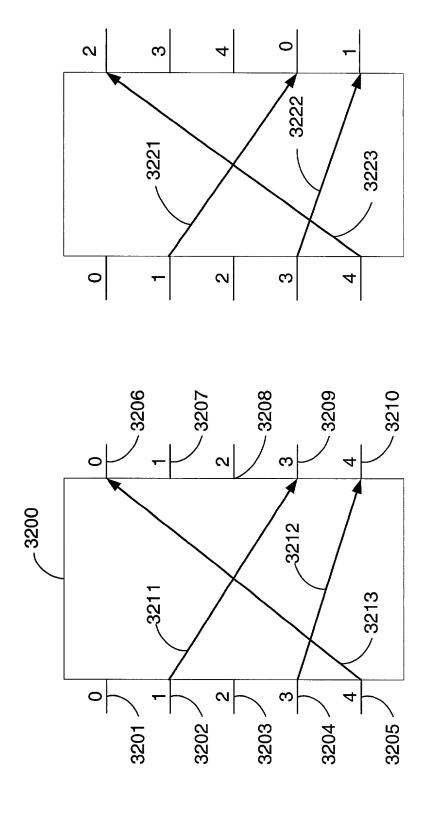
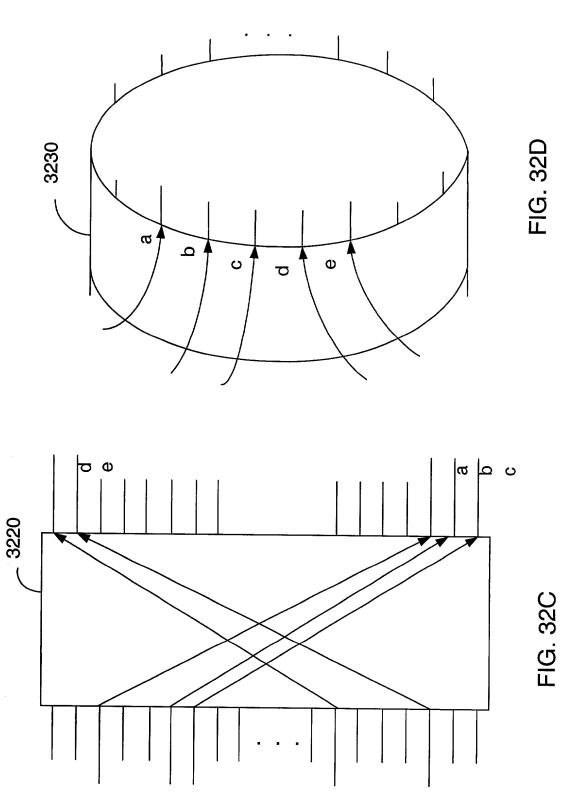
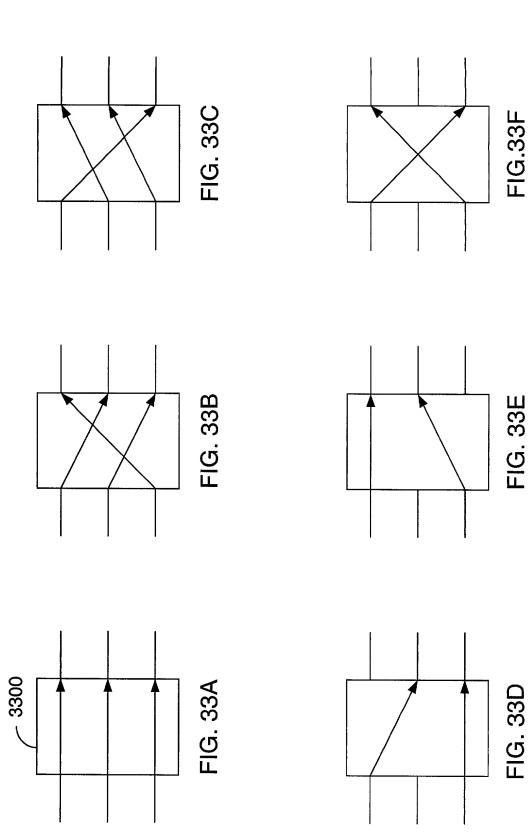


FIG. 32B

FIG. 32A





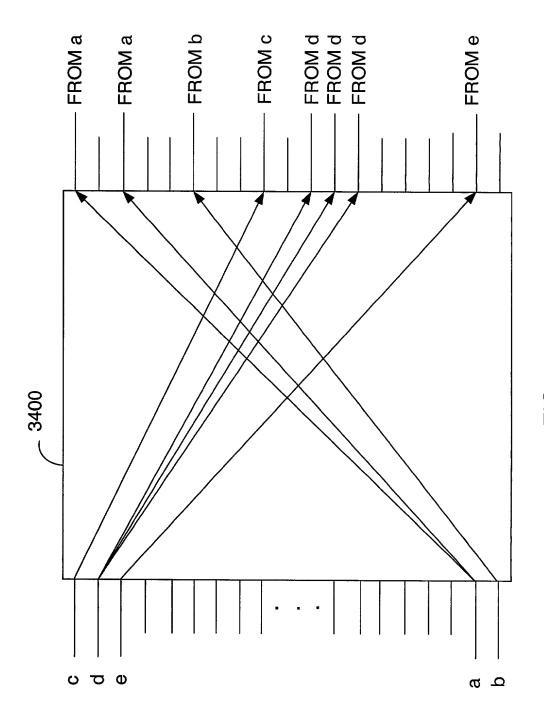
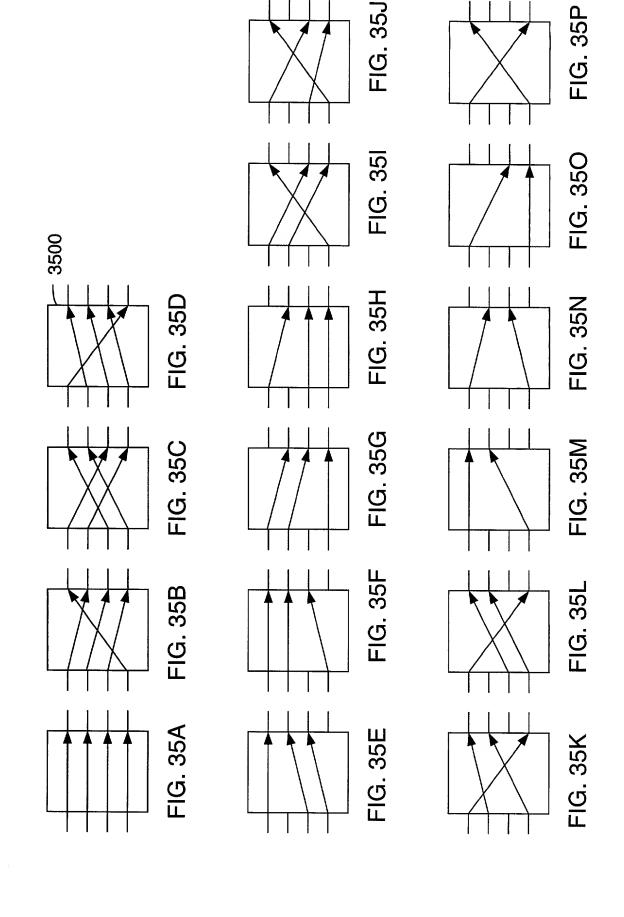
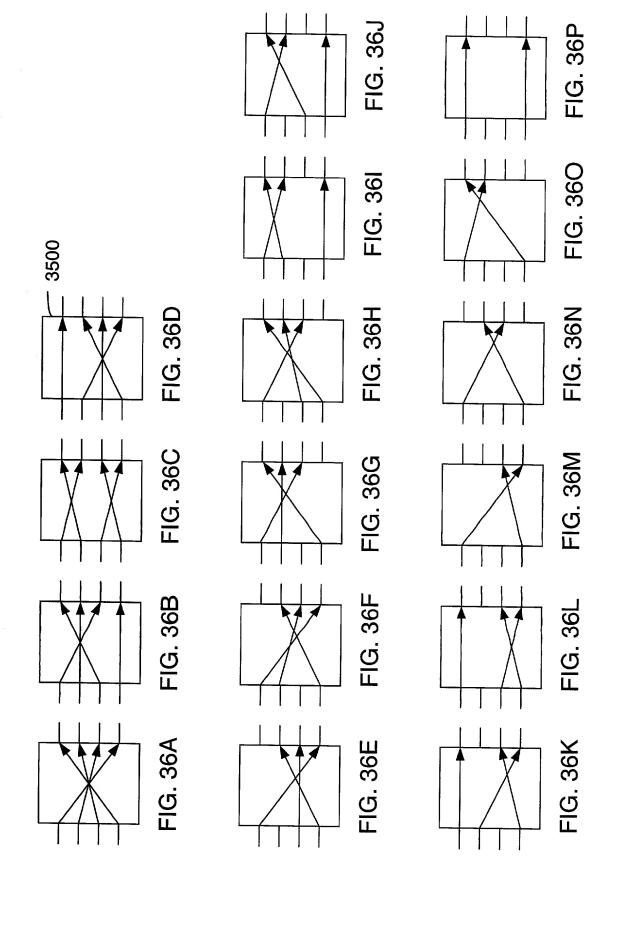
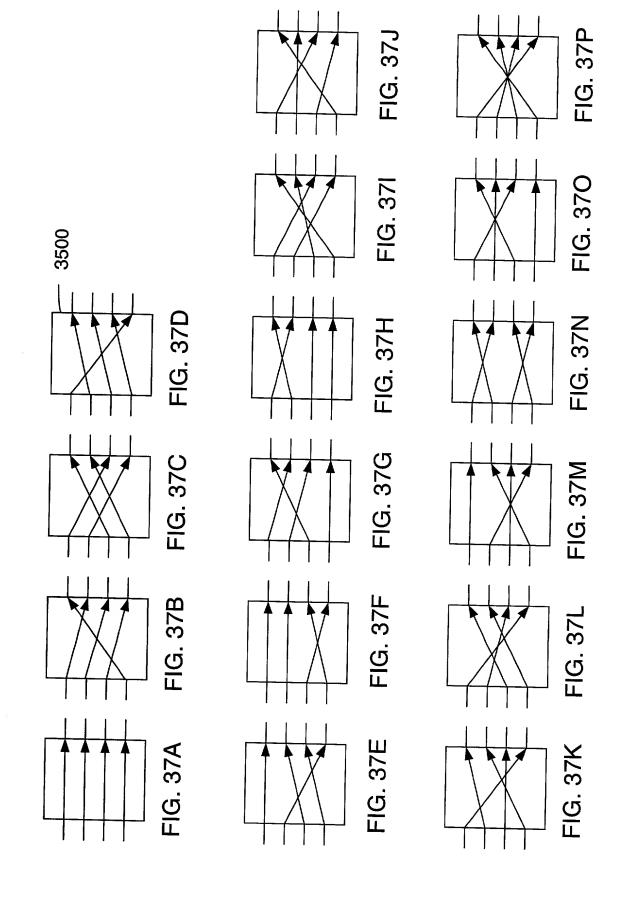
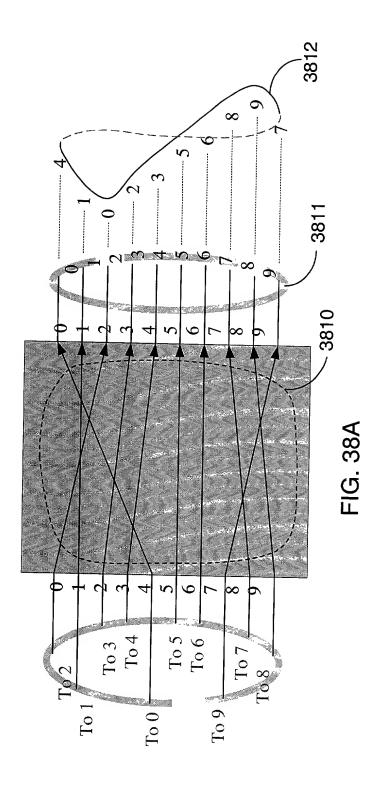


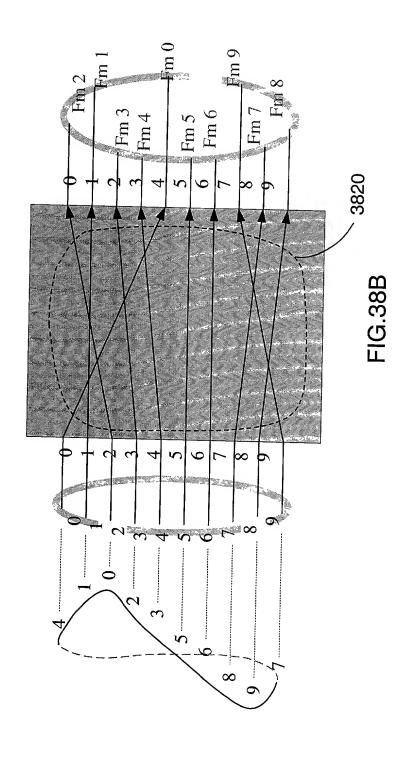
FIG. 34











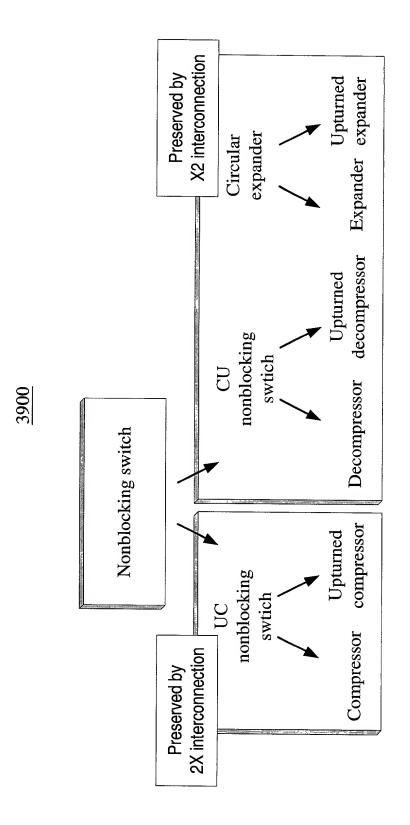
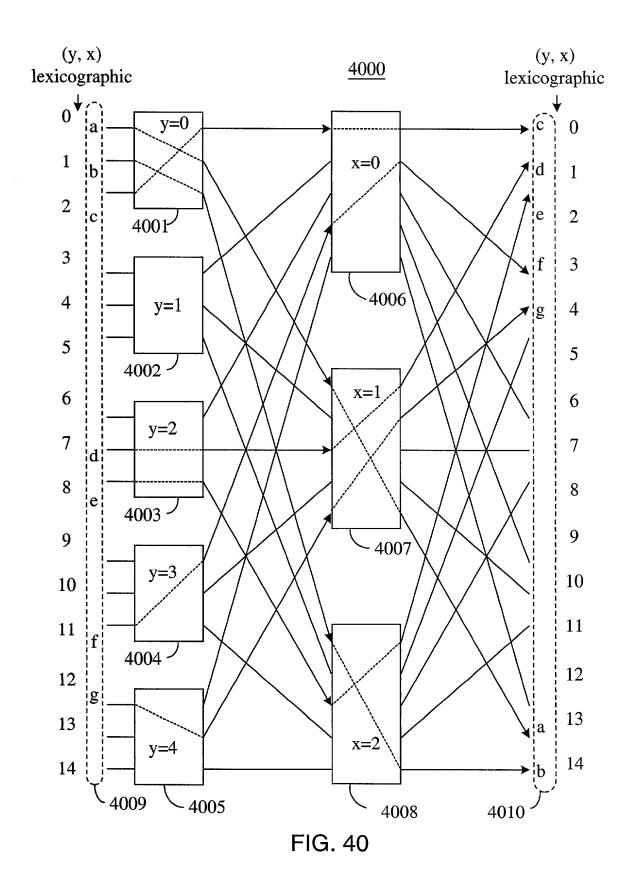


FIG. 39



4100

Preservation of the (1) compressor, (2) upturned compressor and (3) UC nonblocking properties of a switch

Recursive 2X constructions from arbitrary building blocks

Recursive 2X constructions from cells

Banyan-type networks with monotonically decreasing trace and guide

4110

Preservation of the (4) decompressor,

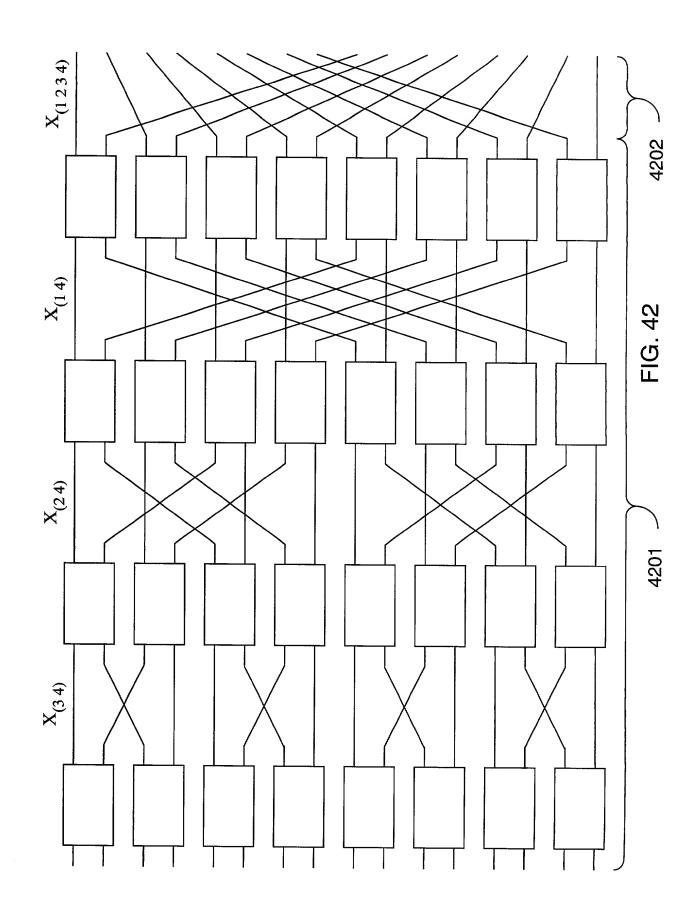
- (5) upturned decompressor,
 - (6) CU nonblocking, (7) expander,
- (8) upturned expander and
 - (9) circular expander properties of a switch

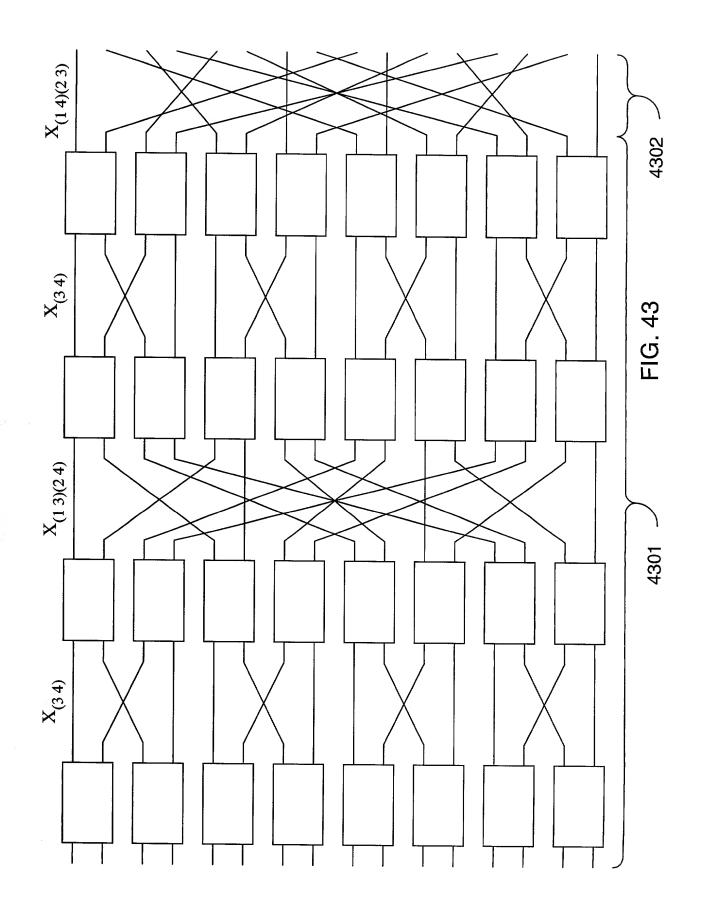
Recursive X2 constructions from arbitrary building blocks

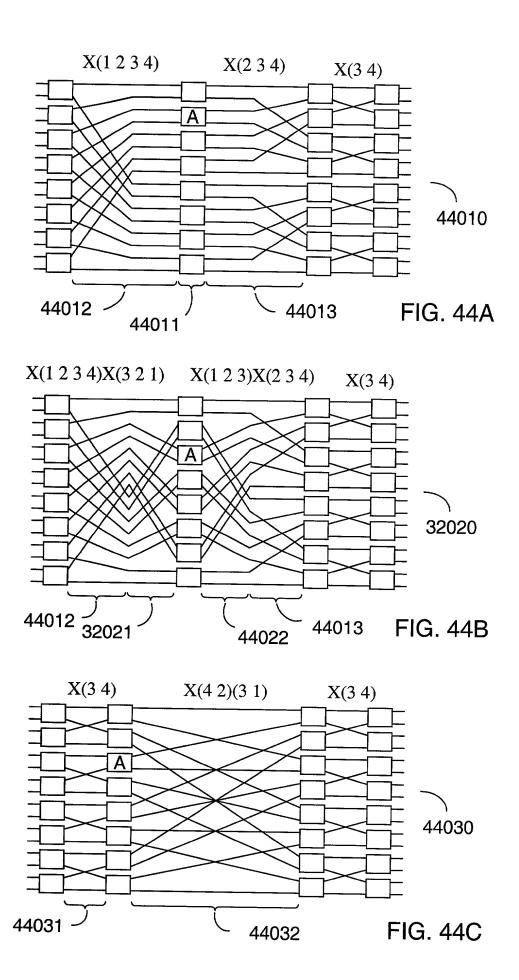
Recursive X2 constructions from cells

Banyan-type networks with monotonically increasing trace and guide

FIG. 41







Equivalence requiring the match of I/O exchanges (<==> common trace and guide

among the networks)

match of input exchange only (<==> common trace among Equivalence requiring the the networks)

match of output exchange only (<==> common guide among Equivalence requiring the

the networks)

Equivalence without requiring the match of I/O exchanges (unconditional)

FIG. 45

Equivalence banyan-type in stronger networks among sense

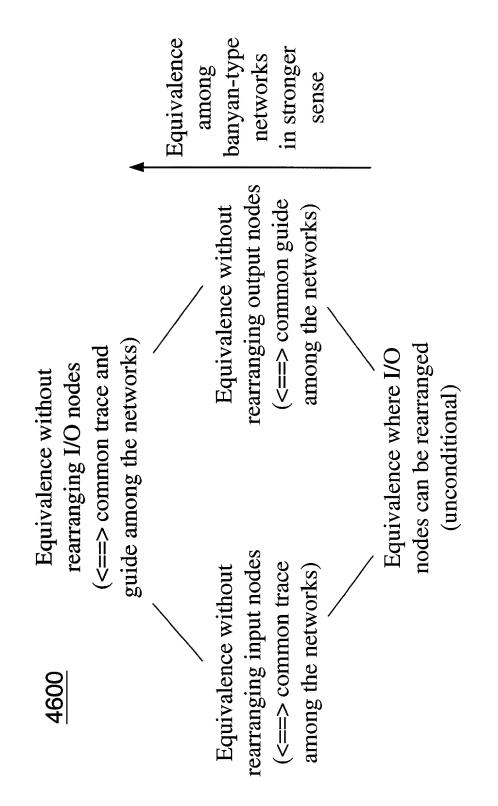


FIG. 46

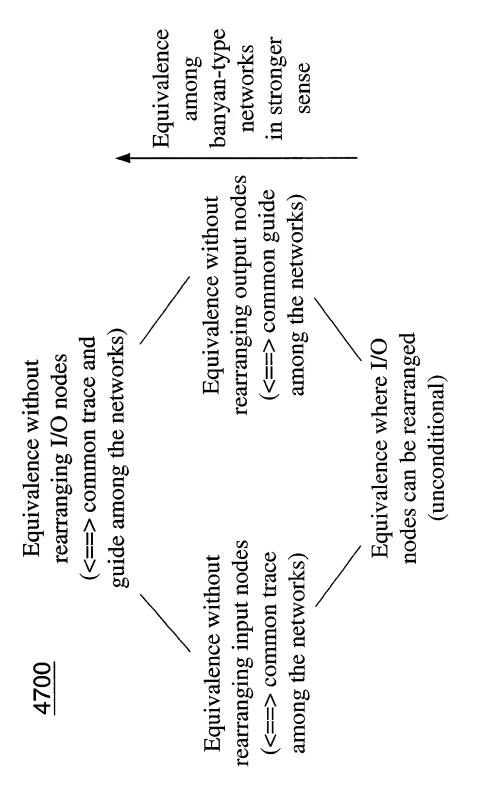


FIG. 47

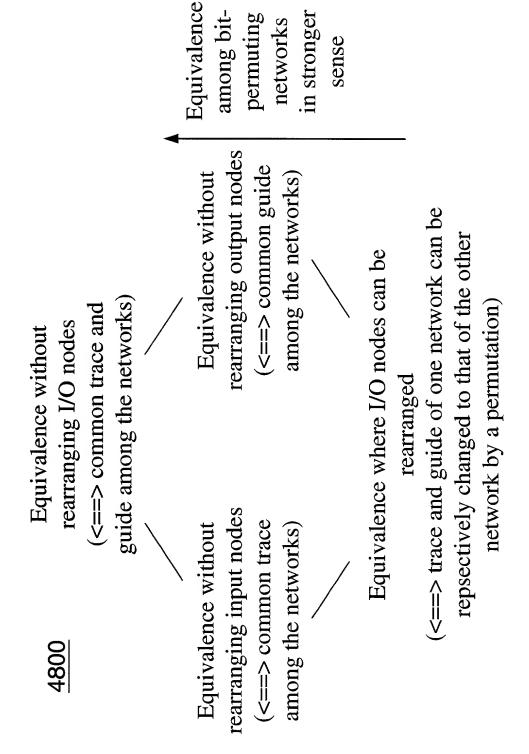
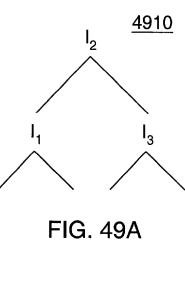
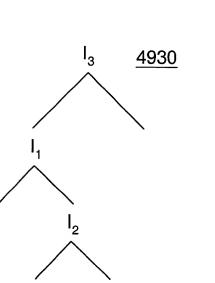
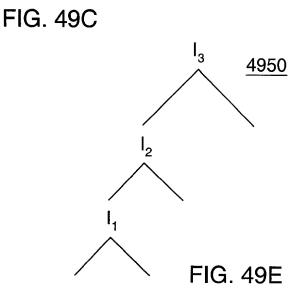
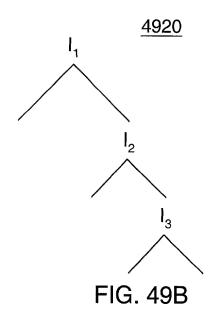


FIG. 48









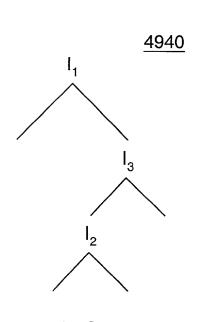
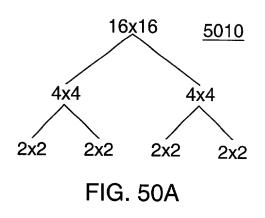
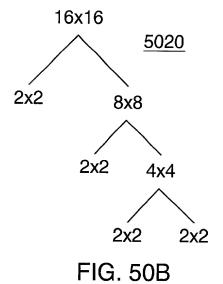
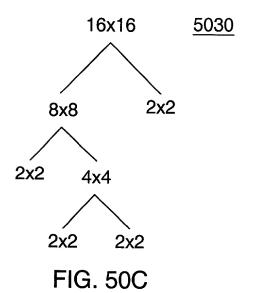
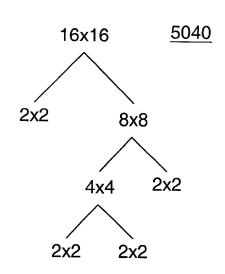


FIG. 49D









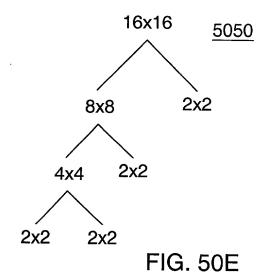


FIG. 50D

<u>5100</u>

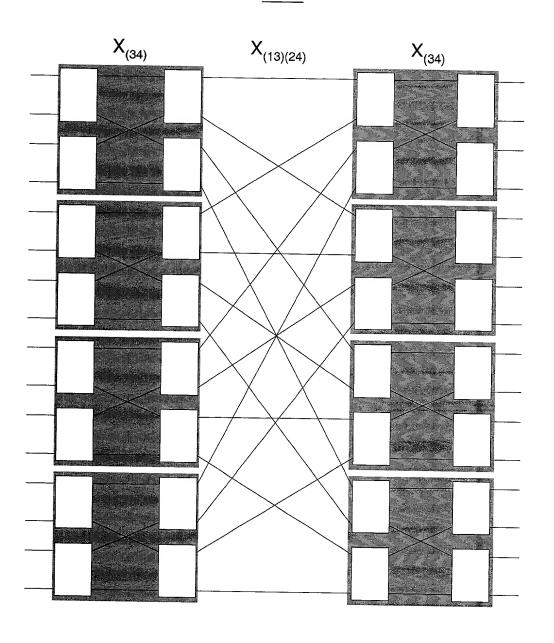


FIG. 51

<u>5200</u>

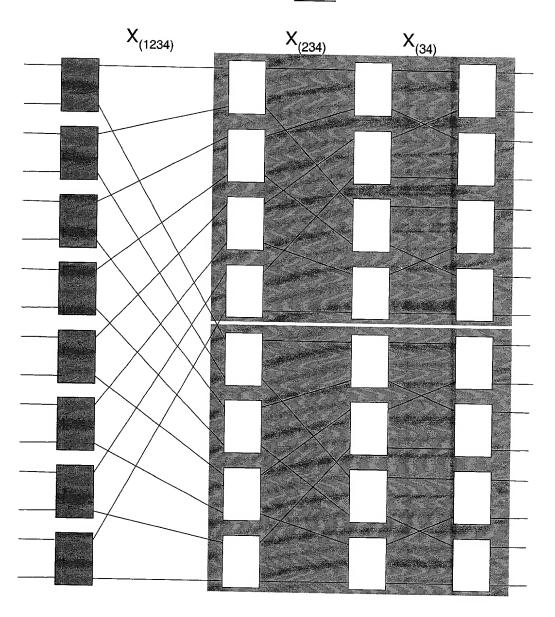
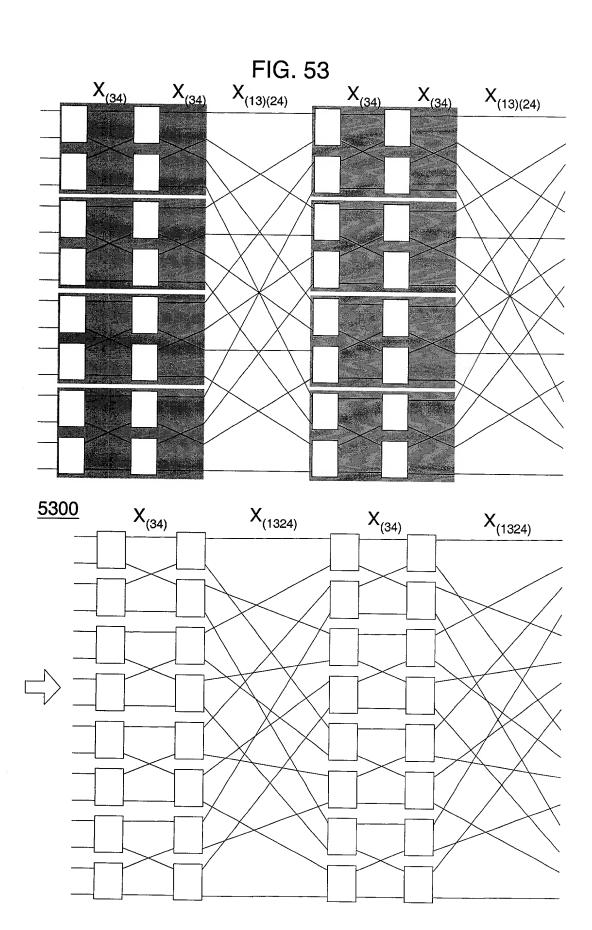


FIG. 52



<u>5400</u>

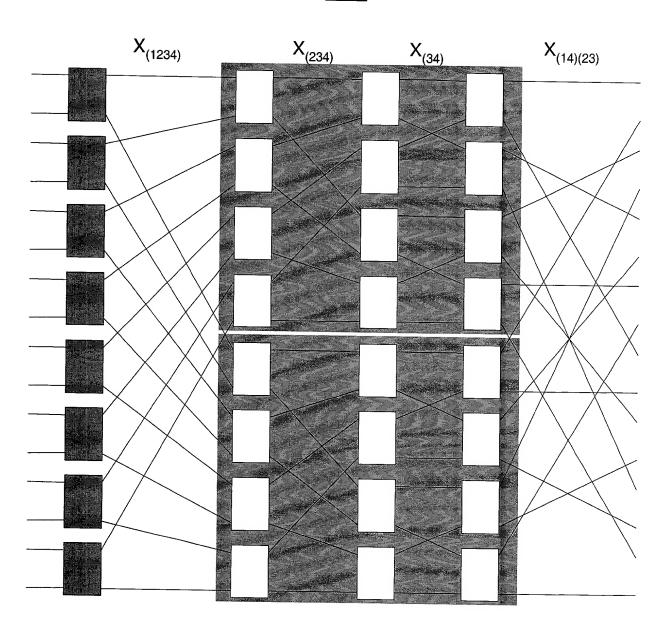


FIG. 54

<u>5500</u>

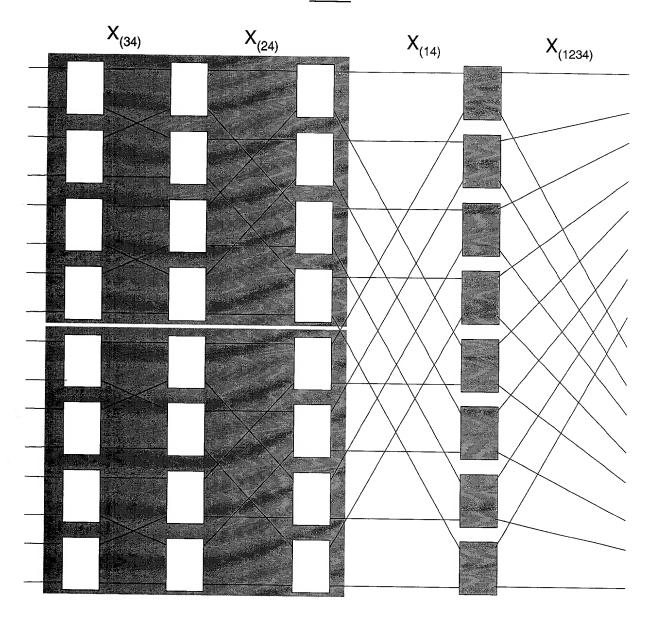
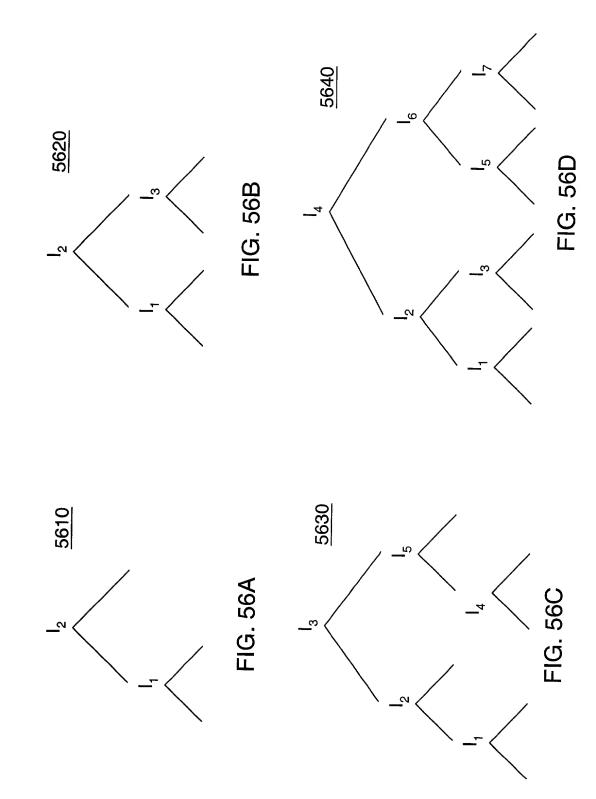
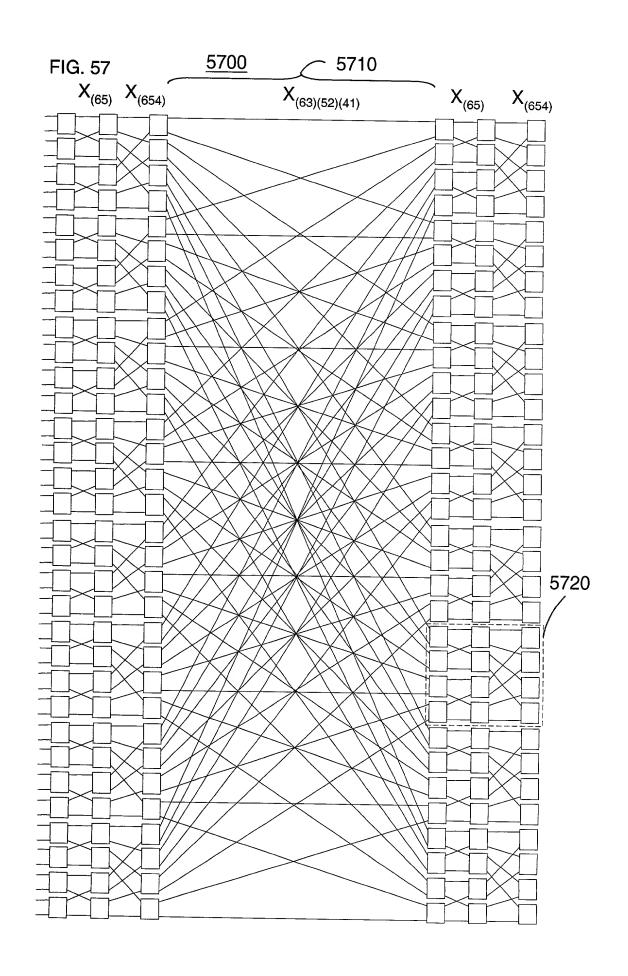
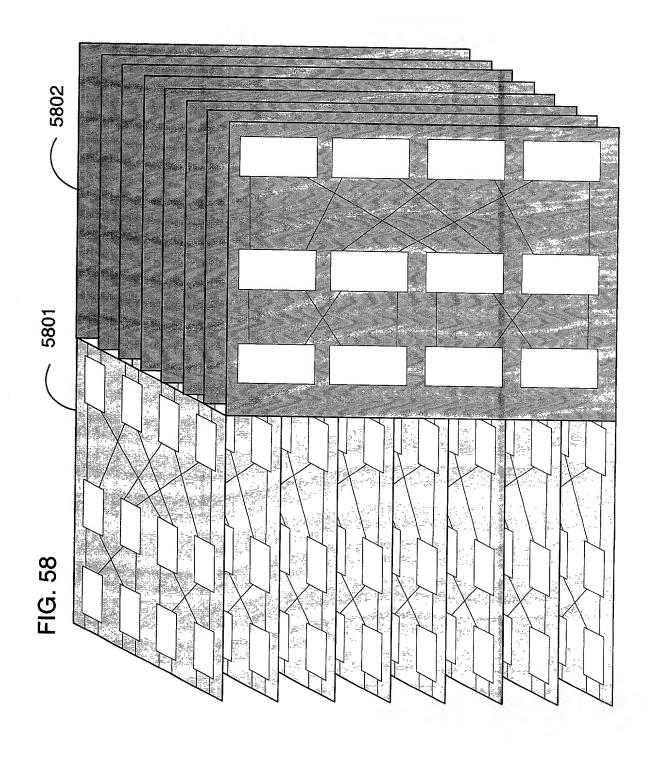
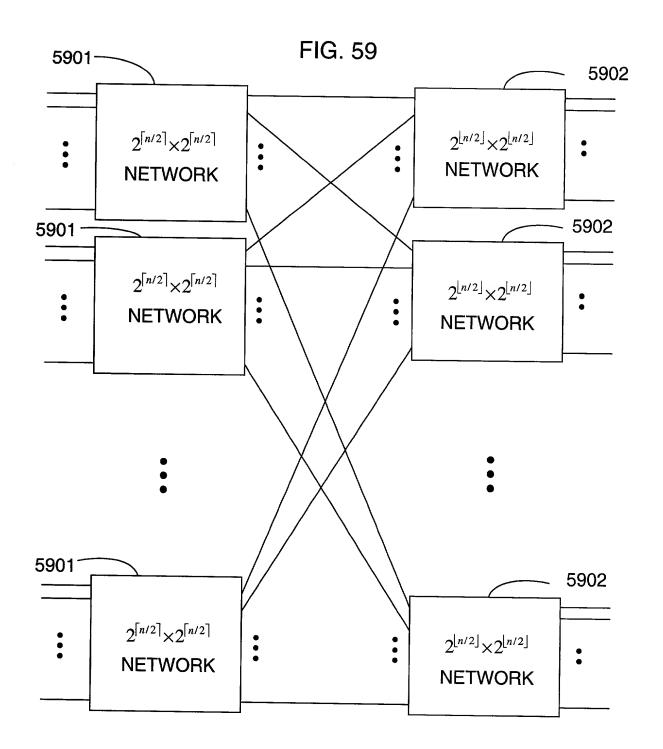


FIG. 55









<u>6000</u>

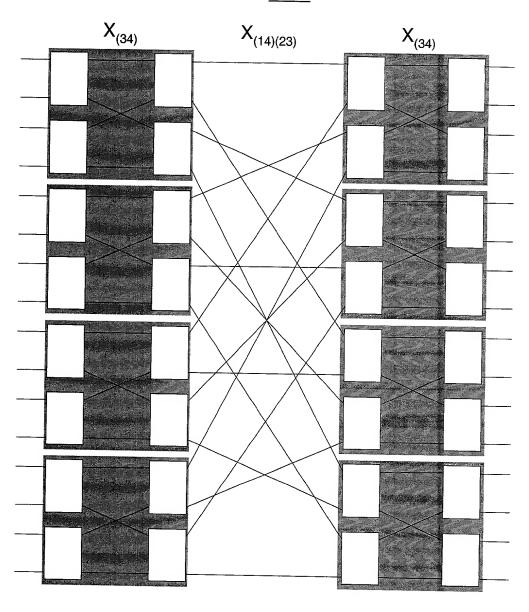
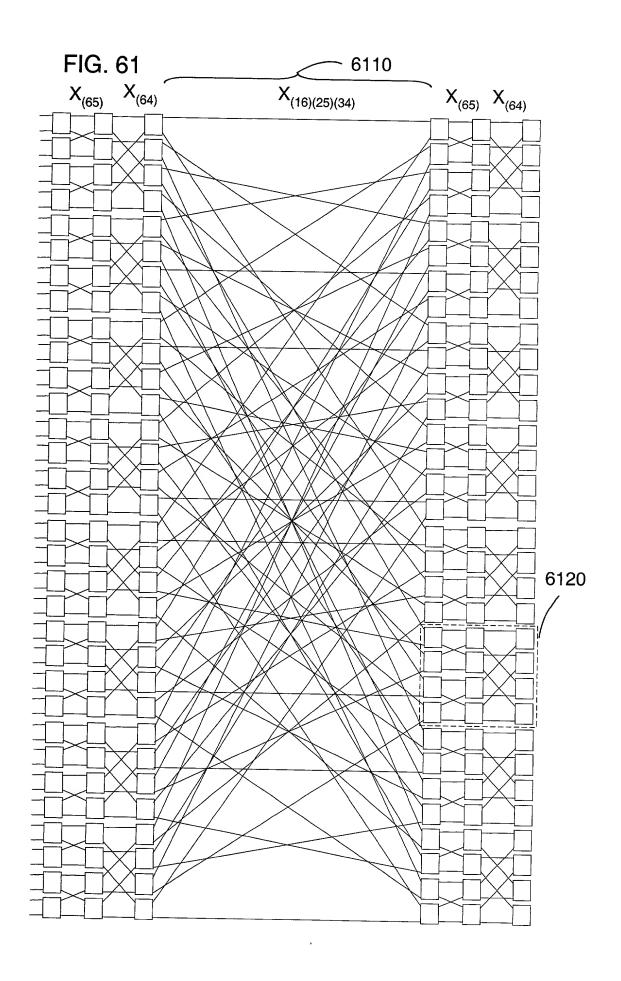


FIG. 60



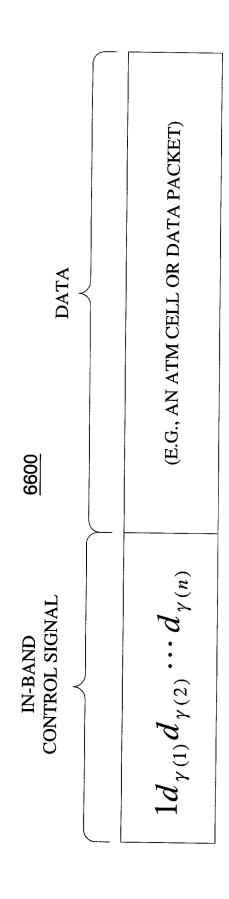


FIG. 66A

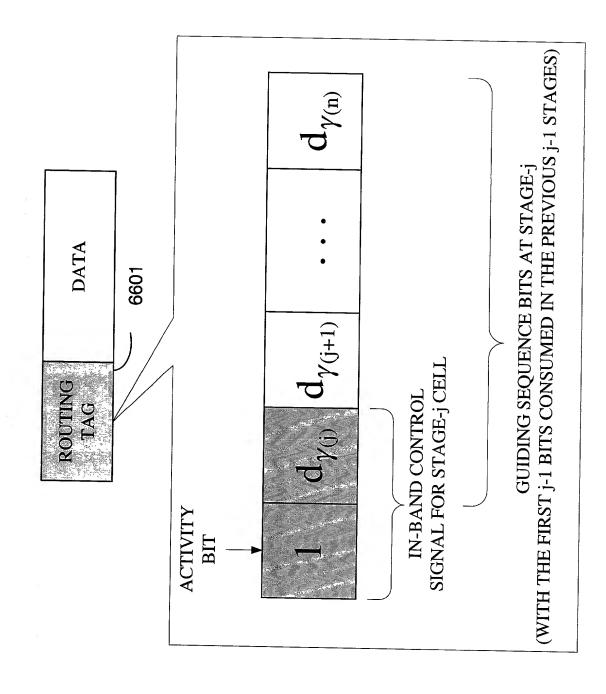
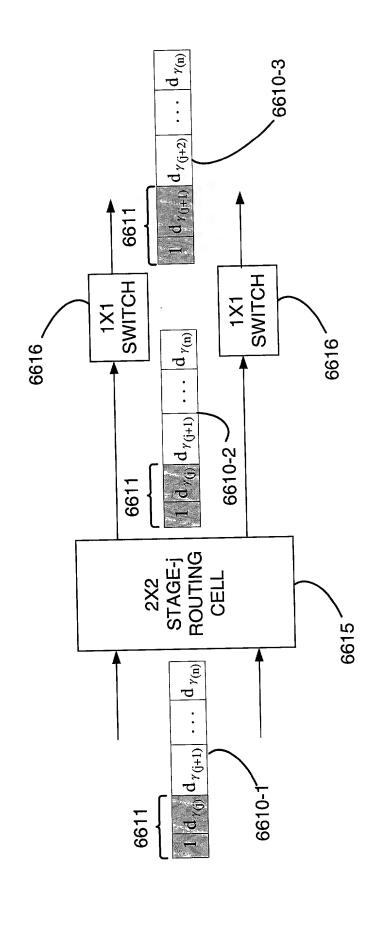


FIG. 66B



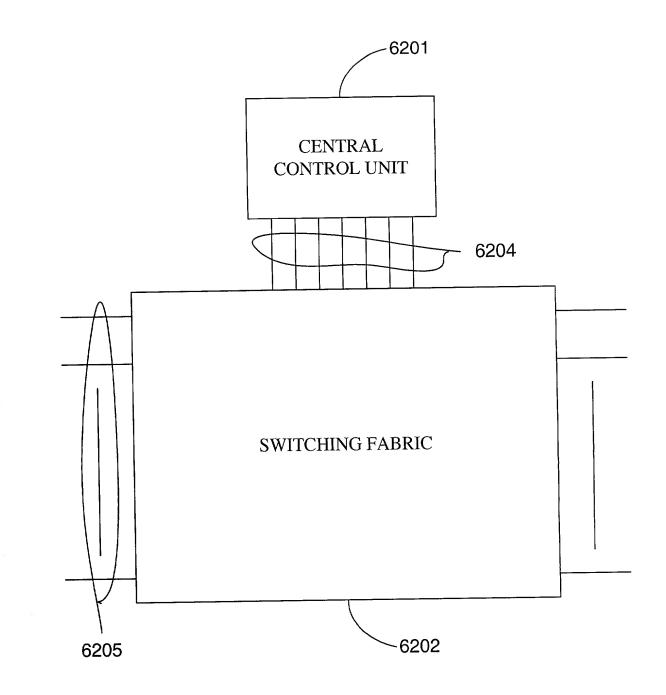


FIG. 62A

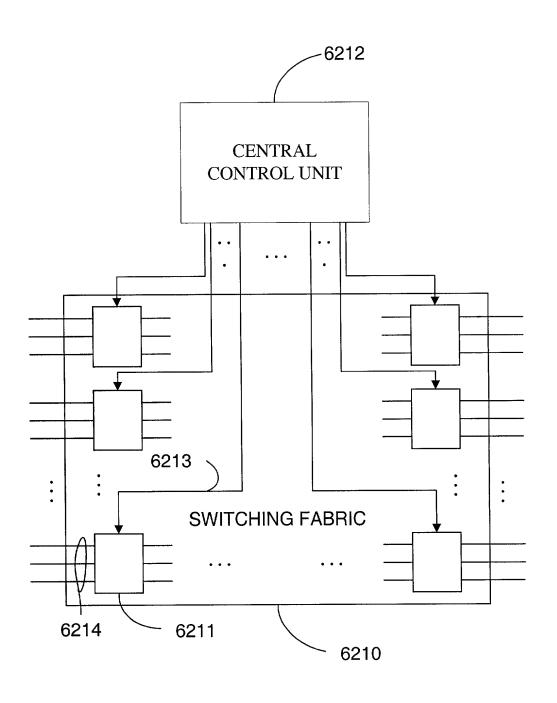
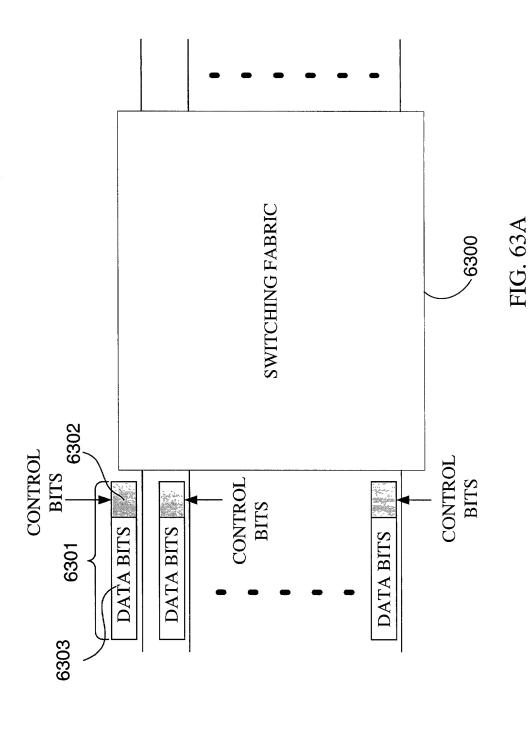


FIG. 62B



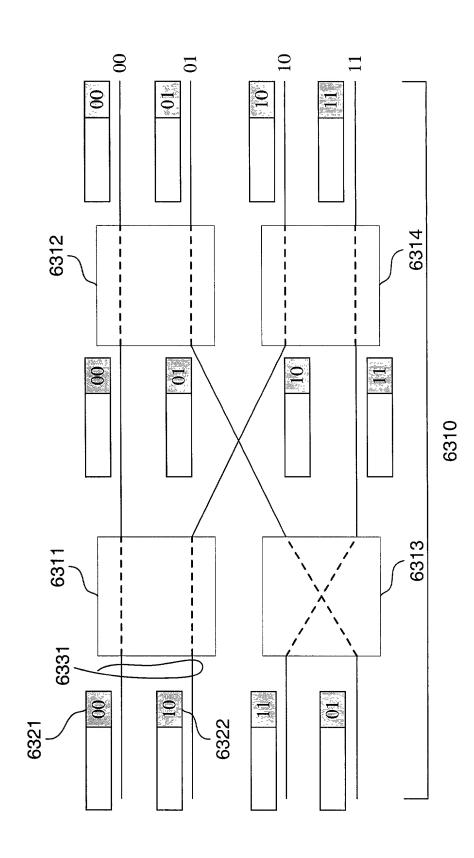


FIG. 63B

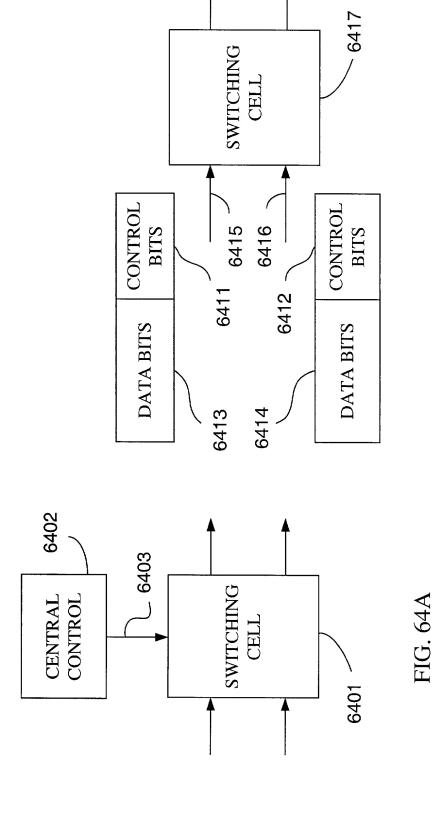
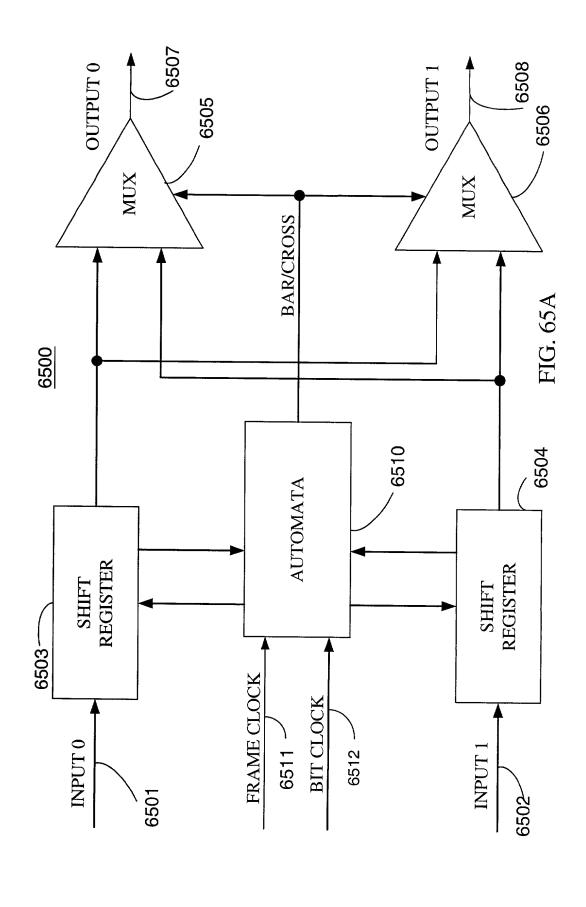


FIG. 64B



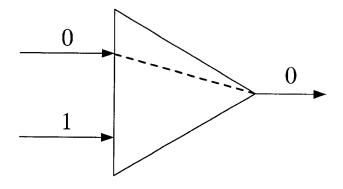


FIG. 65B

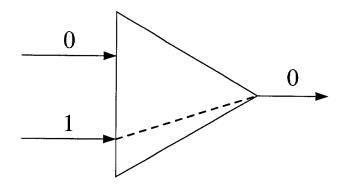


FIG. 65C

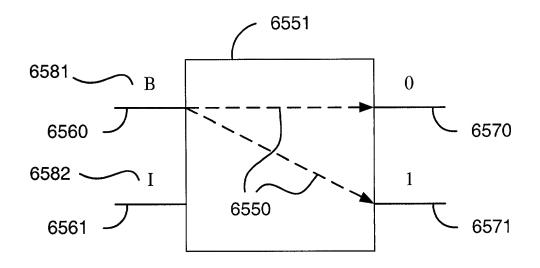


FIG. 65D

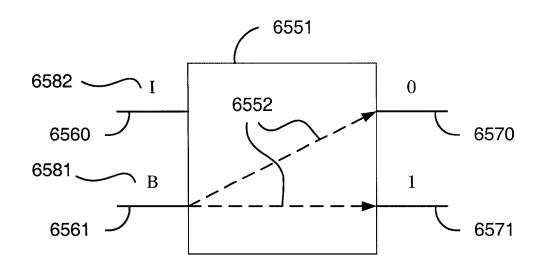
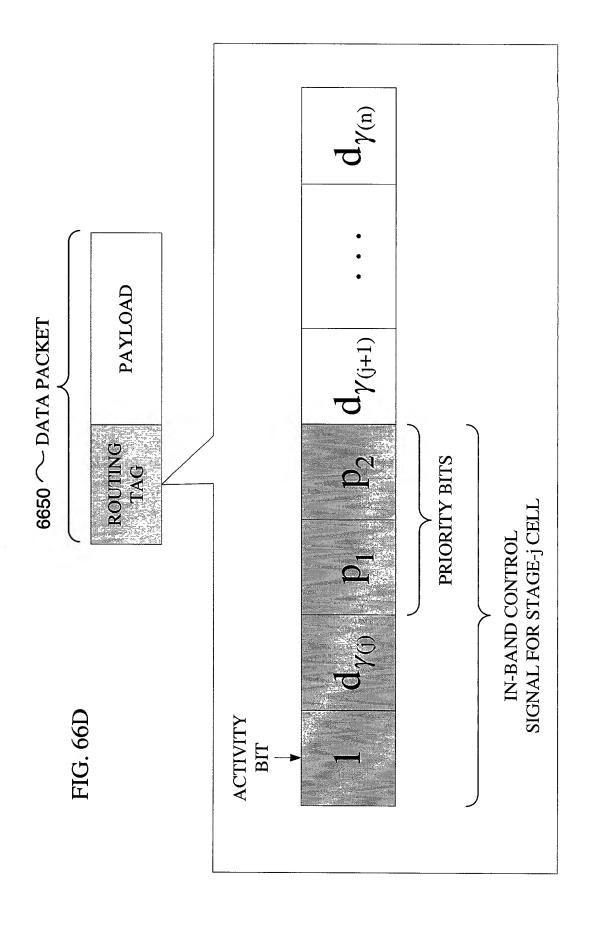
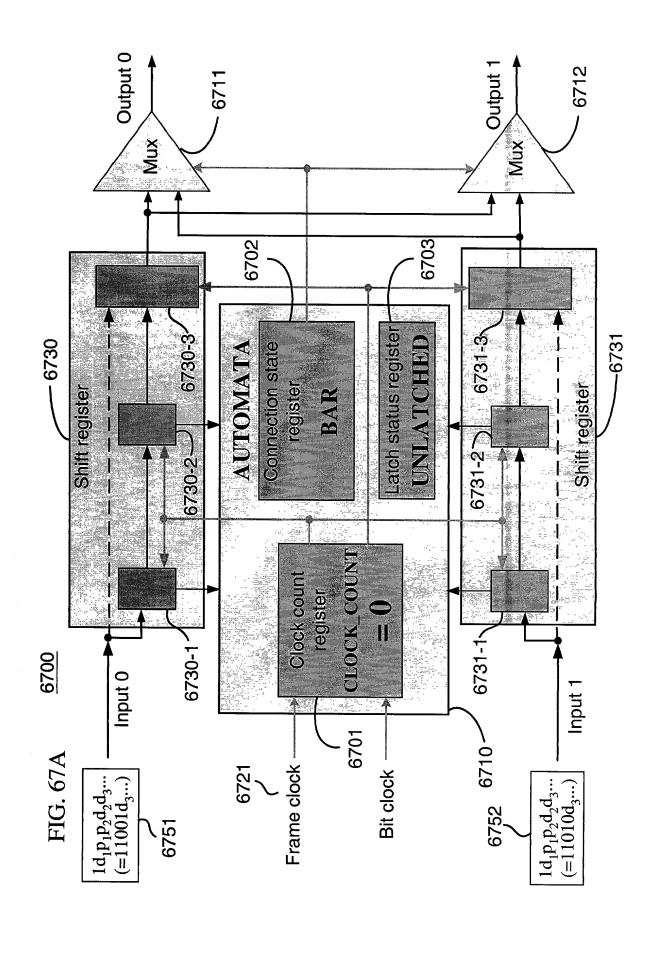
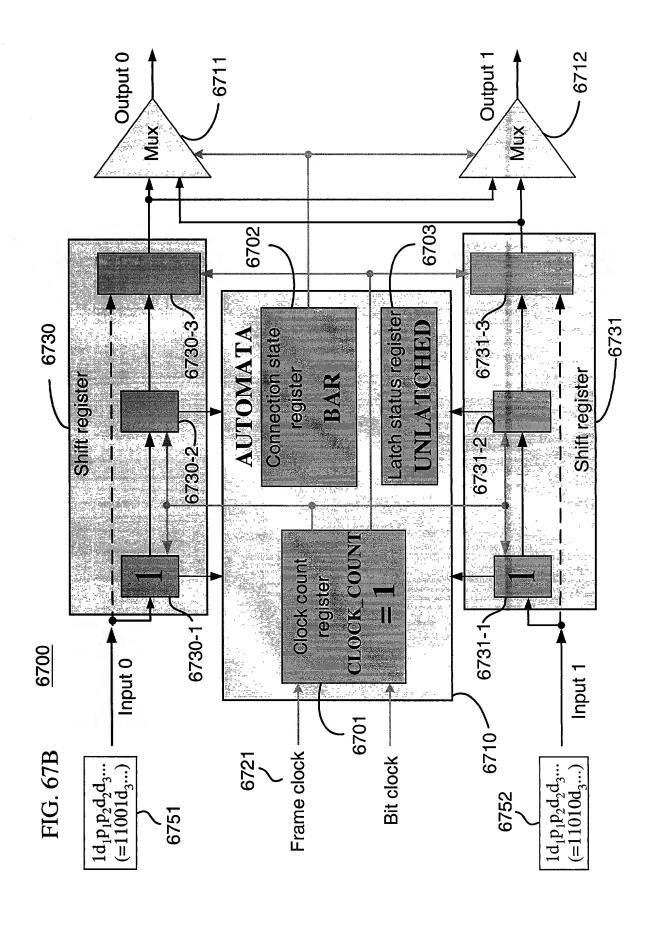
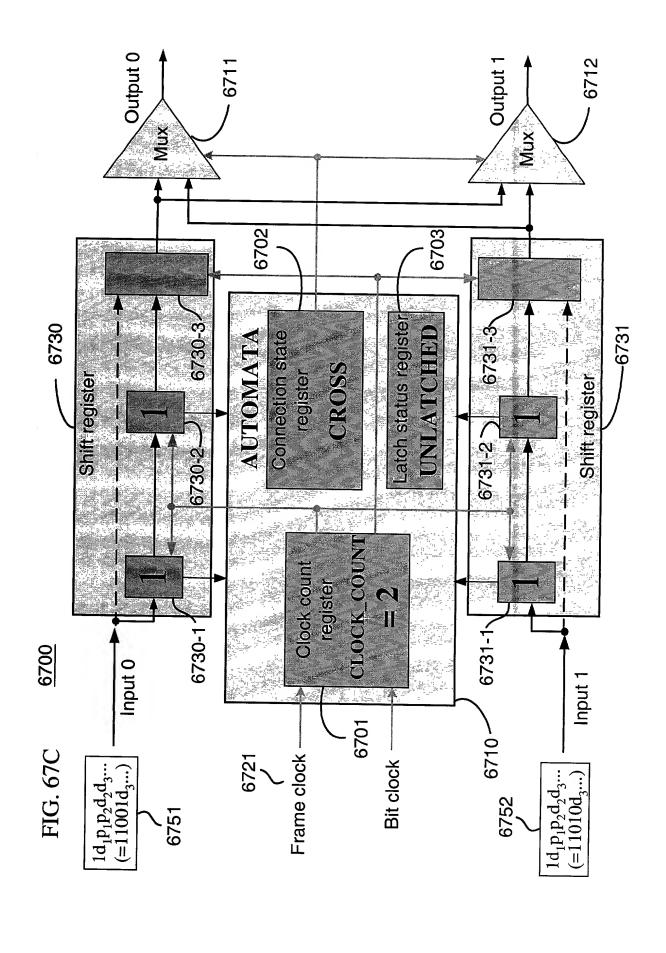


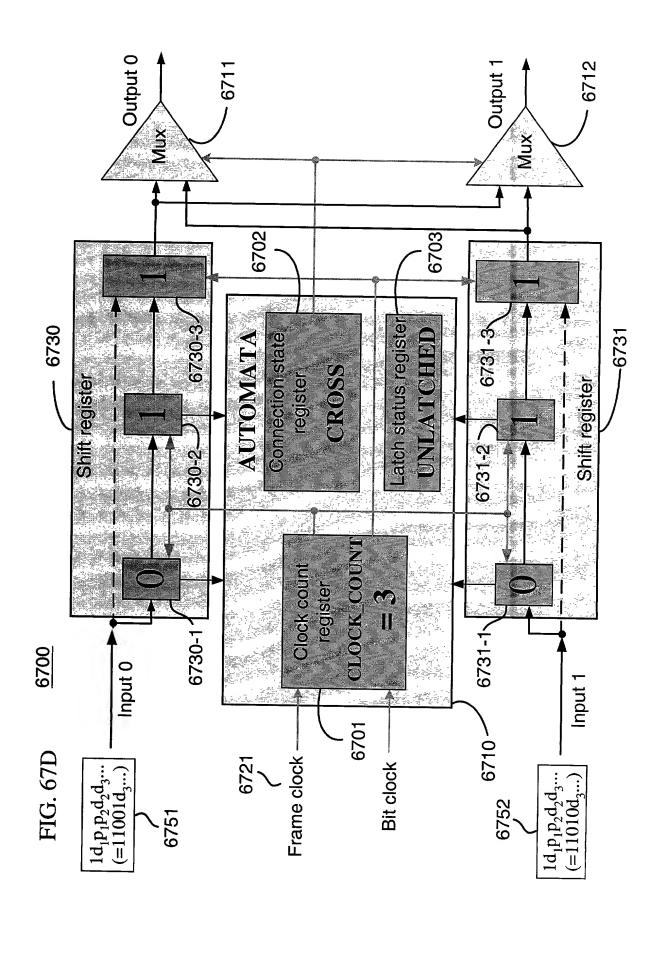
FIG. 65E

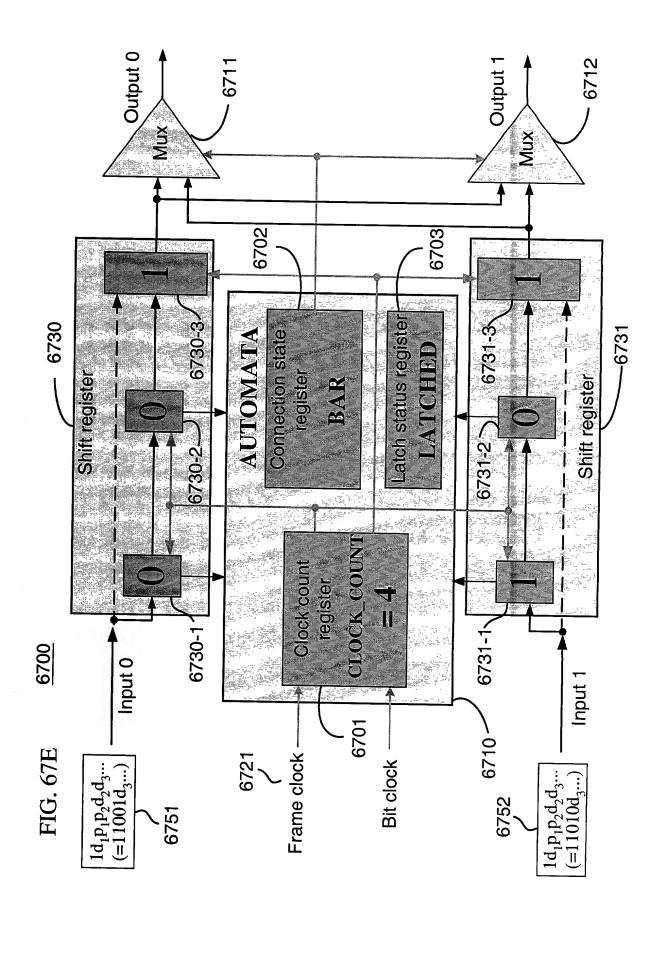


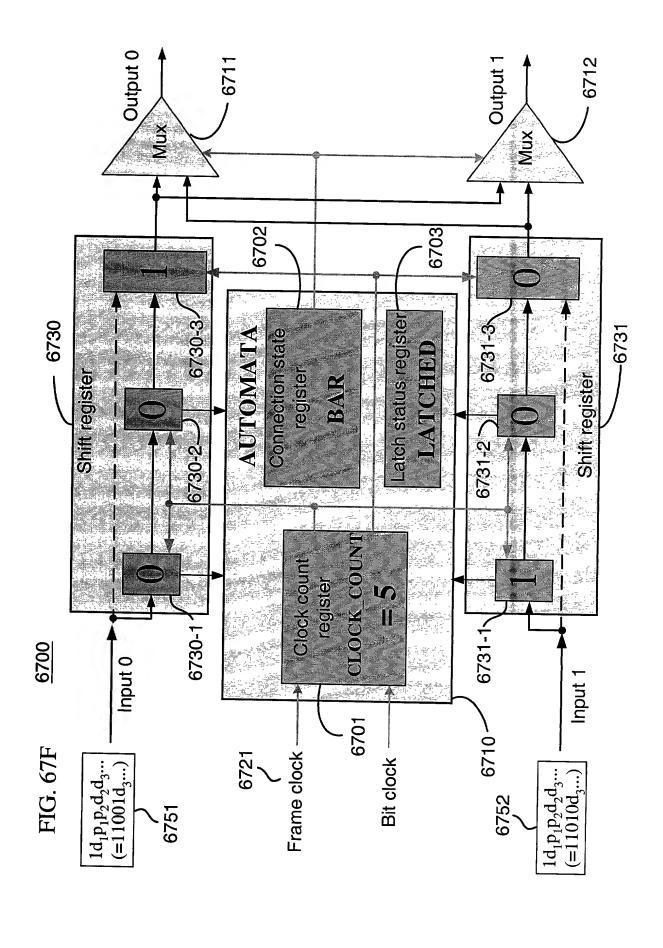












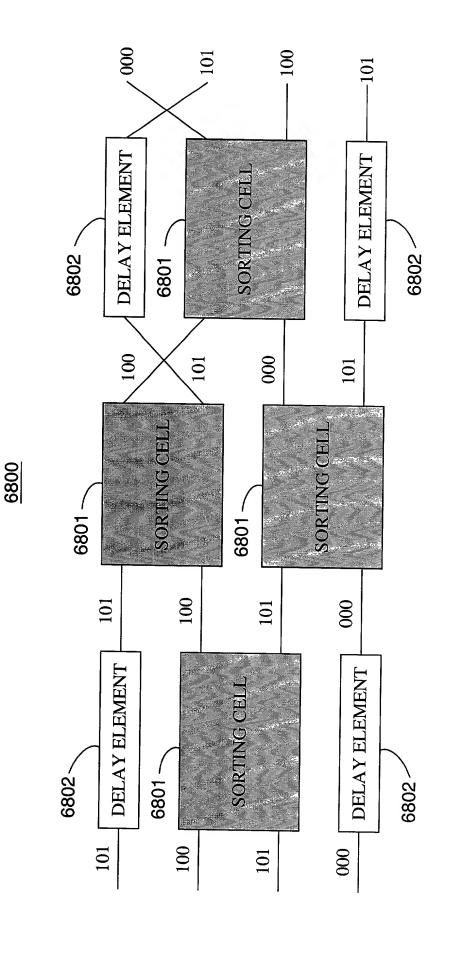
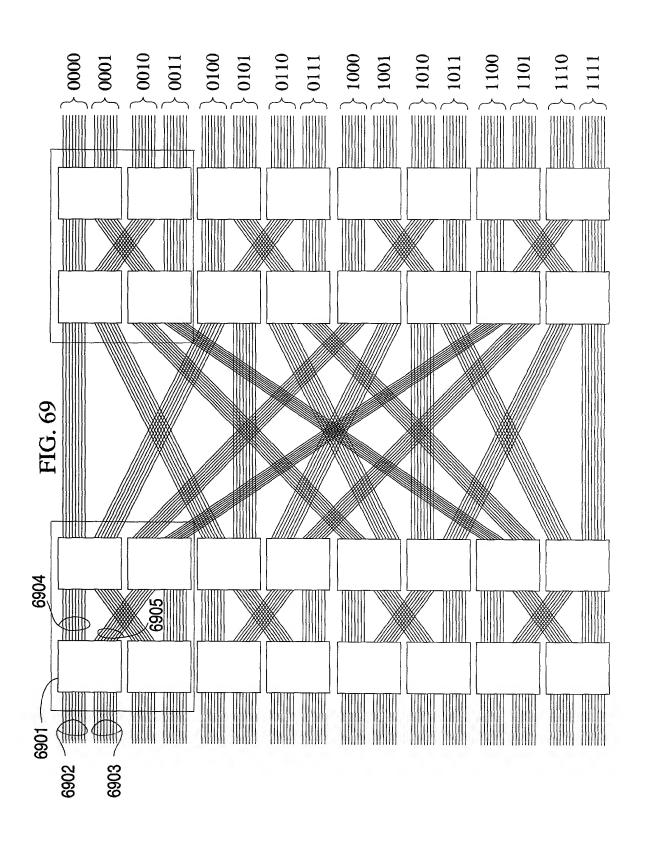
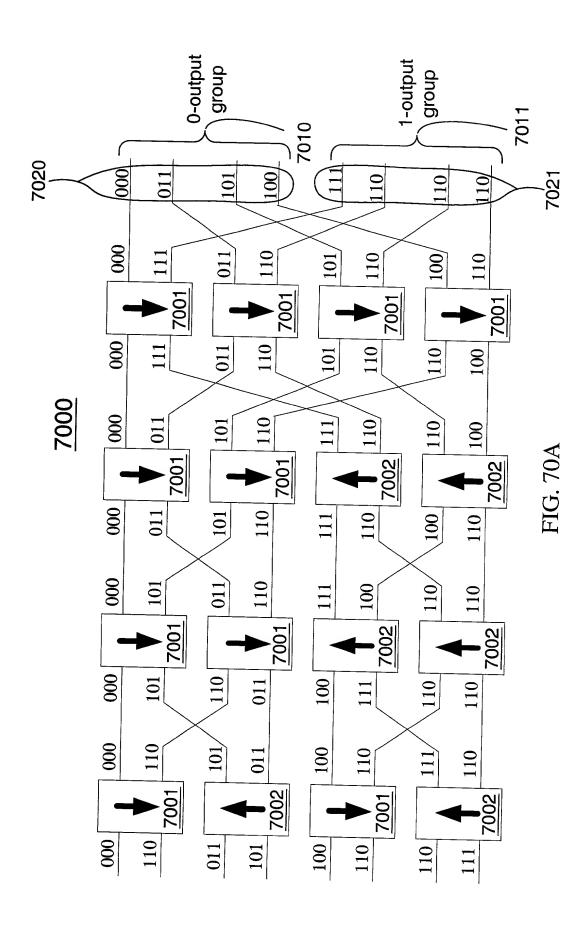
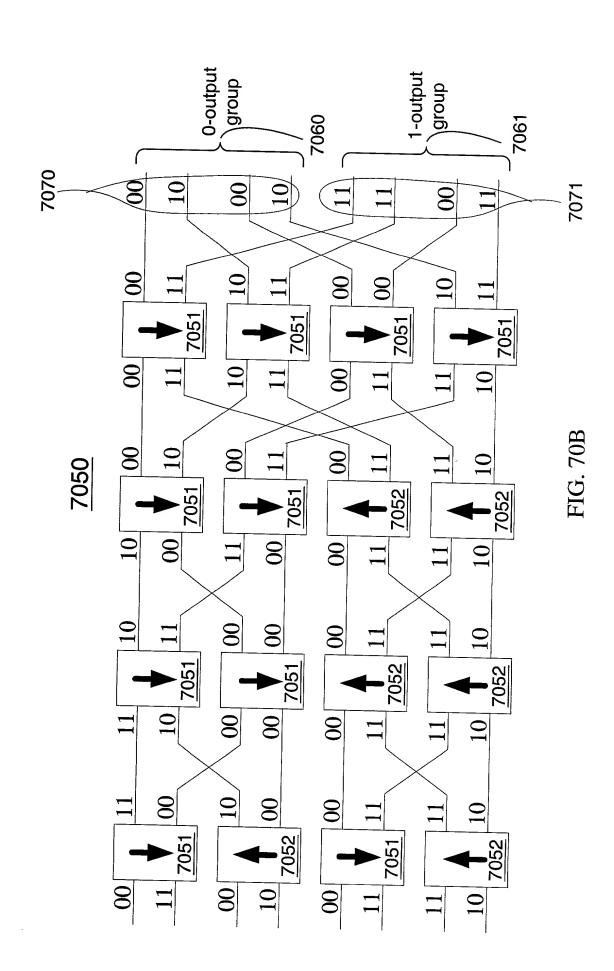


FIG. 68







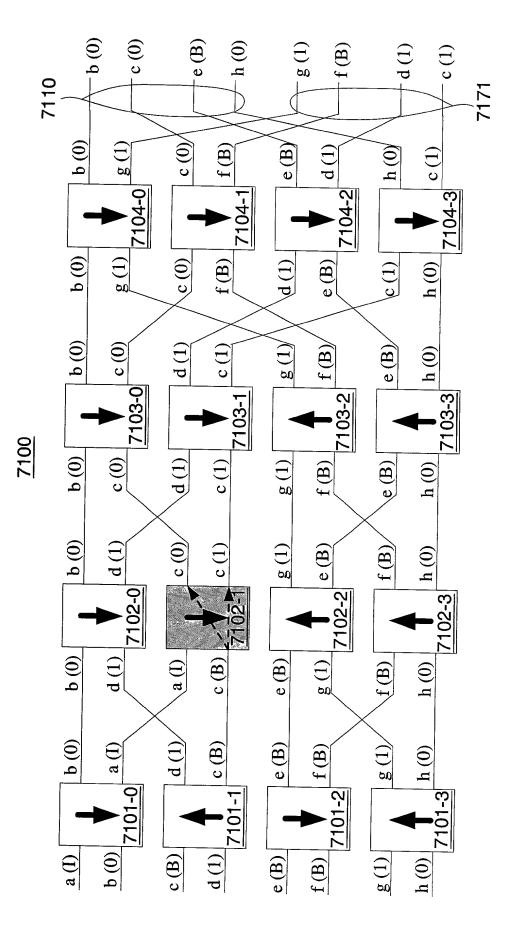


FIG. 71A

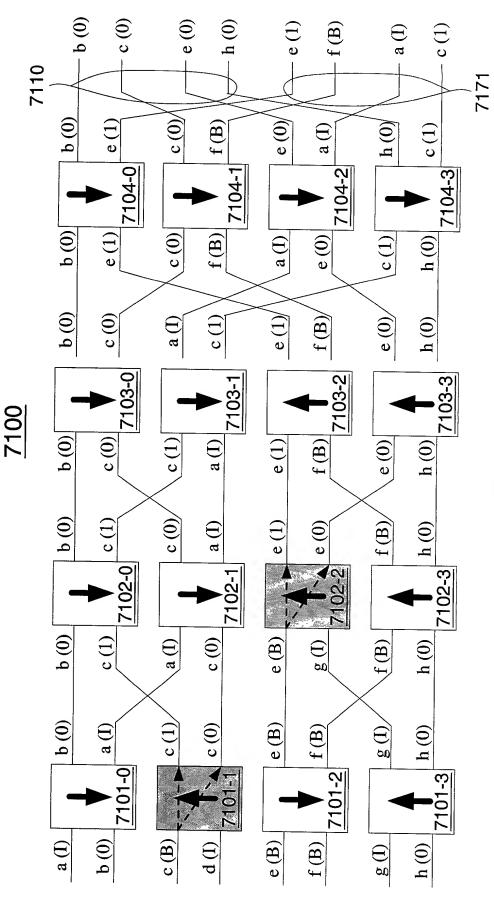


FIG. 71B

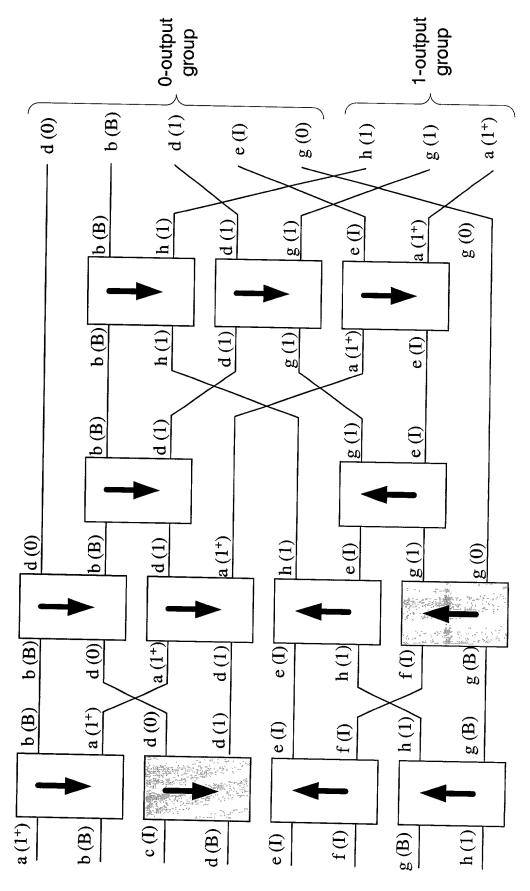


FIG. 72A

